- Specifications

Item			Specifications	
Engine type			Gasoline 3.8GDI	
Automatic transaxle type			A8LF1	
Clutch type			Torque converter	
Drive system			2WD/4WD	
Gear ratio	1st		4.808	
	2nd		2.901	
	3rd		1.864	
	4th		1.424	
	5th		1.219	
	6th		1.000	
	7th		0.799	
	8th		0.648	
	Reverse		3.425	
	Final gear ratio		3.510(2WD)/3.648(4WD)	
Elements	Solenoid valve		Direct control VFS	5ea
			Indirect control VFS	2ea
			ON/OFF	1ea
	Clutch & Brake		Clutch	4ea
			Brake	2ea
			Planetary gear	3ea
	Oil filter			1ea
ATF	ATF Grade	Recommended	Allowed	
		ATF SP-IV or ATF SP4M-1	SK ATF SP-IV or SP4M-1 MICHANG ATF SP-IV or SP4M-1 NOCA ATF SP-IV or SP4M-1 Hyundai Genuine ATF SP-IV or SP4M-1	
	ATF quantity		About 7.0 L (1.85 U.S gal., 7.40 U.S.qt., 6.16 Imp.qt.)	

※ VFS : Variable Force Solenoid

Sensors

Speed Sensor (Input shaft, Middle, Output shaft)

▷ Type : Hall Effect Sensor

▷ Specifications

Items		Specifications
Operation condition(˚C)˚F		(-40 to 150) -40 to 302
Output voltage(V)	High	1.18 - 1.68
	Low	0.59 - 0.84

Oil Temperature Sensor

▷ Type : Negative Thermal Coefficient (NTC)

▷ Specifications

Temp.[(˚C)˚F]	Resistance (kΩ)

(-40) -40	48.1
(-20) -20	15.6
(0) 32	5.88
(20) 68	2.51
(40) 104	1.120
(60) 140	0.612
(80) 176	0.329
(100) 212	0.186
(120) 248	0.109
(140) 284	0.067
(150) 302	0.053

Position Sensor

▷ Specifications

Items	Specifications
Output type	Non-Contact type (2 channels, PWM signal output)
Input power (V)	4.5 - 5.5

Solenoid Valves

▷ Specifications

Items		Specifications	
Direct control VFS	Normally Low : 28/B, 46/C, 37R/C Normally High : UD/C, OD/C&LR/B	Control current (mA)	0 - 1100
		Control pressure [kpa (kgf/cm, psi)	0 - 1,569.06 (0 - 16, 0 - 227.57)
		Internal resistance (Ω)	5.3 ± 0.3
Indirect control VFS	Normally Low : T/CON Normally High : LINE	Control current (mA)	0 - 850
		Control pressure [kpa (kgf/cm, psi)]	0 - 519.75 (0 - 5.3, 0 - 75.38)
		Internal resistance (Ω)	5.1 ± 0.3
ON / OFF	SS - A	Control voltage (V)	9 - 16
		Control pressure [kpa (kgf/cm, psi)]	0 - 490.33 (0 - 5.0, 0 - 71.12)
		Internal resistance (Ω)	10 - 11

Solenoid Valve & Clutch/Brake Operation Table

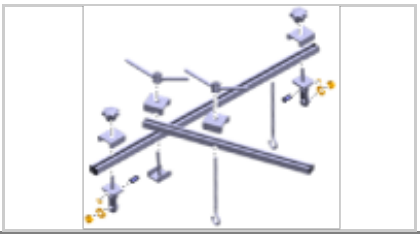
	Solenoid Valve								Clutch				Brake	
	ON/OFF	VFS												
		Direct					Indirect							
	SS-A	28/B_VFS	46/C_VFS	37R/C_VFS	UD/C_VFS	OD/C & LR/B_VFS	T/CON_VFS	LINE_VFS	46/C	37R/C	UD/C	OD/C	28/B	LR/B
P	●				●			◎						●
R	●			●	●			◎		●				●
N	●				●			◎						●
1	●						◎	◎			●			●
2		●				●	◎	◎			●		●	
3				●		●	◎	◎		●	●			

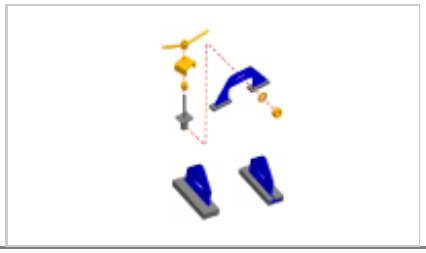
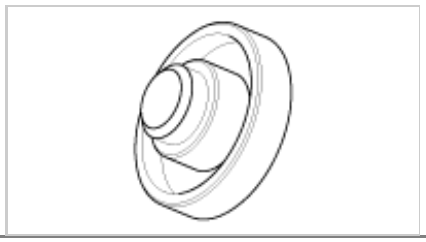
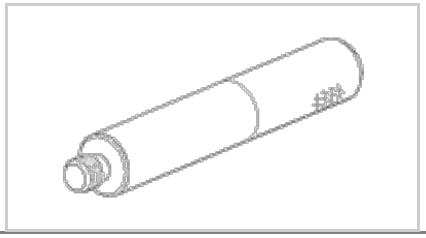
4			•			•	◎	◎	•		•			
5							◎	◎			•	•		
6			•		•		◎	◎	•			•		
7				•	•		◎	◎		•		•		
8		•			•		◎	◎				•	•	
Remarks	● : Connected ◎ : Variable connected								●: In operation					

Tightening Torques

Item	Tightening Torques		
	N.m	kgf.m	lb-ft
Postion sensor mounting nut	9.8 - 11.8	1.0 - 1.2	7.2 - 8.7
Electronic shift actuator mounting bolt	20.6 - 26.5	2.1 - 2.7	15.2 - 19.5
Transaxle support bracket mounting bolt	58.9 - 78.5	6.0 - 8.0	43.4 - 57.8
Transaxle mounting bracket bolt	107.9 - 127.5	11.0 - 13.0	79.6 - 94.0
Roll rod support bracket mounting bolt	49.0 - 68.6	5.0 - 7.0	36.2 - 50.6
Starter mounting bolt	49.0 - 63.7	5.0 - 6.5	36.2 - 47.0
Transaxle upper mounting bolt	63.7 - 83.4	6.5 - 8.5	47.0 - 61.5
	32.4 - 49.0	3.3 - 5.0	23.9 - 36.2
Transaxle lower mounting bolt	39.2 - 46.1	4.0 - 4.7	28.9 - 33.9
	78.5 - 98.1	8.0 - 10.0	57.9 - 72.3
ATF filler plug (eyebolt)	4.9 - 5.9	0.5 - 0.6	3.6 - 4.3
ATF drain plug	33.3 - 43.1	3.4 - 4.4	24.6 - 31.8
Transaxle control module mounting nut	9.8 - 11.8	1.0 - 1.2	7.2 - 8.7
Valve body cover mounting bolt	11.8 - 13.7	1.2 - 1.4	8.7 - 10.1
Main harness mounting bolt	9.8 - 11.8	1.0 - 1.2	7.2 - 8.7
Main connector fixing clip mounting bolt	9.8 - 11.8	1.0 - 1.2	7.2 - 8.7
Oil temperature sensor mounting bolt	9.8 - 11.8	1.0 - 1.2	7.2 - 8.7
Speed sensor mounting bolt	9.8 - 11.8	1.0 - 1.2	7.2 - 8.7

- Special Service Tools

Tool Name / Number	Illustration	Description
09200-3N000 Engine support fixture (Beam)		Removal and installation of the transaxle. Use this beam (SST No. : 09200-38001 or 09200-3N000) with the supporter (SST No. : 09200-2S000).
09200-2S000 Engine support fixture (Supporter)		Removal and installation of the transaxle. Use this supporter (SST No. : 09200-2S000) with the beam (SST No. : 09200-38001 or 09200-3N000).

		
09453-3L240 Oil seal installer		2WD : Installation of the differential oil seal in the transaxle case and housing side 4WD : Installation of the differential oil seal in the housing side [Using with bar (SST No.:09231-H1100)]
09430-B8100 Oil seal installer		4WD : Installation of the differential oil seal in the housing side [Using with bar (SST No.:09231-H1100)]
09231-H1100 Bar		Installation of the differential oil seal in the transaxle case and housing side. [Using with oil seal installer]
09459-4G100 Position sensor neutral fixed jig		Used to align the neutral position when installing the position sensor.

- Troubleshooting

Limp Home Mode

- Features a fail-safe function that prevents dangerous situations in the event of a transaxle failure. The vehicle will be driven in limp home mode if the transaxle malfunctions. In this mode, the transaxle operates at a minimal functionality level (fixed shifting, limited shifting, reverse, neutral), making it possible for the vehicle to reach a service center.

Information

- Limp Home Mode : Limited shifting
- Mechanical limp home mode : Fixed shifting (failure of mechanical parts, solenoid valves, TCM, CAN communication)

Troubleshooting

symptoms		Suspected areas	Remedy

Delayed shifting / shift shock while driving	1st → 2nd or 2nd → 1st	1. 28, OD&LR solenoid valve fault (If shifting 4th to 5th operates as normal, replace 28 solenoid valve) 2. 28, LR brake fault	1. Replace the faulty solenoid valve 2. Check for the clutch/brake abnormality - Disc damage - Piston D-ring damage - Clutch sealing damage ※ Replace the transaxle assembly when the clutch/brake damaged ※When a shift shock occurs, check the shift position in manual mode and reproduce the symptoms.
	2nd → 3rd or 3rd → 2nd	1. 37R, 28 solenoid valve fault (If shifting 1st to 2nd operates as normal, replace 37R solenoid valve) 2. 37R, 28 clutch fault	
	3rd → 4th or 4th → 3rd	1. 46, 37R solenoid valve fault (If shifting 2nd to 3rd operates as normal, replace 46 solenoid valve) 2. 46, 37R clutch fault	
	4th → 5th or 5th → 4th	1. OD&LR, 46 solenoid valve fault (If shifting 3rd to 4th operates as normal, replace OD solenoid valve) 2. OD, 46 clutch fault	
	5th → 6th or 6th → 5th	1. 46, OD&LR solenoid valve fault (If shifting 4th to 5th operates as normal, replace 46 solenoid valve) 2. 46, OD clutch fault	
	6th → 7th or 7th → 6th	1. 37R, 46 solenoid valve fault (If shifting 4th to 5th operates as normal, replace 37R solenoid valve) 2. 37R, 46 clutch fault	
	7th → 8th or 8th → 7th	1. 28, 37R solenoid valve fault (If shifting 3rd to 4th operates as normal, replace 28 solenoid valve) 2. 28, 37R clutch fault	
Shifting shock while stopped	N → D / N → R	1. D position : UD solenoid valve fault 2. R position : 37R solenoid valve fault 3. UD/37R clutch fault	1. Replace UD solenoid valve 2. Replace 37R solenoid valve 3. Inspect UD/37R clutch
Thumping noise	P → D	Sound occurs when the parking sprague is released	Normal
Vibrating while stopped (in the N position)	N	UD solenoid valve fault	Replace the UD solenoid valve
Delay/jerk when the damper is engaged		1. ECM / TCM mapping 2. The damper clutch solenoid valve fault 3. Torque converter oil flow path pressure leakage 3. The Oil Level Low	Check the current state using the dirogger 1. The ECM / TCM update 2. Replace the valve body assembly 3. Replace the torque converter and the inspect oil level
Blinking the cluster gear position lamp		Oil pressure characteristics values not entered	Enter the oil pressure characteristics values
Mechanical limp home mode (locked into 5th)		The solenoid valve fault	Replace the faulty solenoid valve
		TCM fault	Replace the TCM
		CAN communication fault	Inspect the CAN communication line
		The position switch fault	Replace the position switch
			Inspect the position switch connector connection
Limp home mode		Input & output speed sensor fault	Replace the speed sensor

(locked into 5th, 2nd - 5th manual shift enabled)	The connector connection fault	Inspect the main connector connection
		Replace the main harness
Manual shift disabled	TCM fault	Replace the TCM
	The Connector connection fault	Check shift lever connector connection
	The manual mode switch fault	Replace the shift lever

Self-diagnosis

Transaxle Control Module (TCM) is in constant communication with the control system's components (sensors and solenoids).

If an abnormal signal is received for longer than the predefined duration, TCM recognizes a fault, stores the fault code in memory, and then sends out a fault signal through the self-diagnosis terminal. Such fault codes are independently backed up and will not be cleared even if the ignition switch is turned off, the battery is disconnected, or the TCM connector is disconnected.

⚠ CAUTION

- Disconnecting a sensor or an actuator connector while the ignition switch is in the "On" position generates a Diagnostic Trouble Code (DTC) and commits the code to memory. In such event, disconnecting the battery will not clear the fault diagnosis memory. The diagnosis tool must be used to clear the fault diagnosis memory.
- Before disconnecting the cable from battery terminal, turn the ignition switch to OFF. Removal or connection of the battery cable during engine operation or while the ignition switch is ON could cause damage to the Transaxle Control Module (TCM).
- When checking the generator for the charging state, do not disconnect the battery '+' terminal to prevent the Engine Control Module (ECM) from damage due to the voltage.
- When charging the battery with the external charger, disconnect the vehicle side battery terminals to prevent damage to the TCM.
- When battery voltage is excessively low, diagnostic trouble codes can not be read. Be sure to check the battery for voltage and the charging system before starting the test.

Inspection Procedure (Using the diagnostic tool)

1. Turn OFF the ignition switch.
2. Connect the diagnostic tool to the data link connector on the lower crash pad.
3. Turn ON the ignition switch.
4. Use the diagnostic tool to check the diagnostic trouble code.
5. Repair the faulty part from the diagnosis chart.
6. Erase the diagnostic trouble code.
7. Disconnect the diagnostic tool.

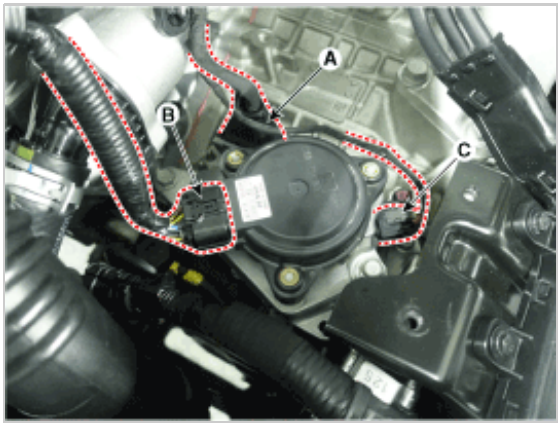
- Removal

⚠ CAUTION

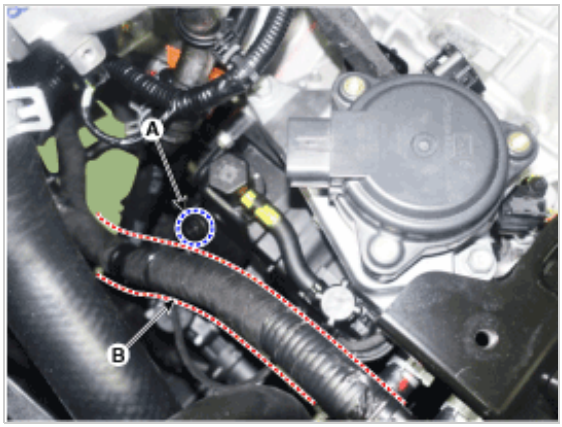
- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.
- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.

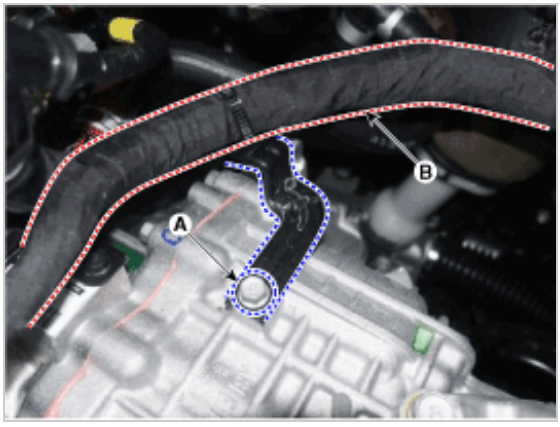
2. Remove the air duct and the air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
3. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
4. Disconnect the main connector (A), electronic shift actuator connector (B) and position sensor connector (C).



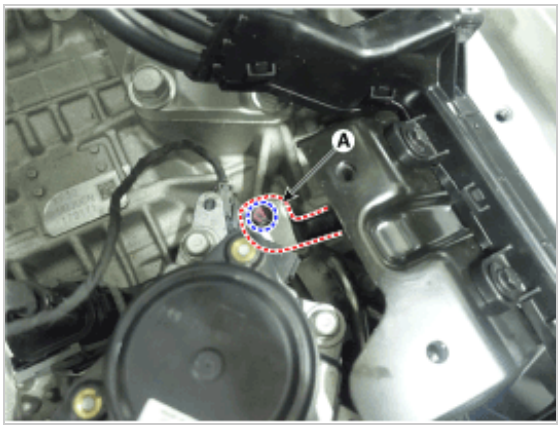
5. Remove the bolt (A) and then separate the wiring (B).



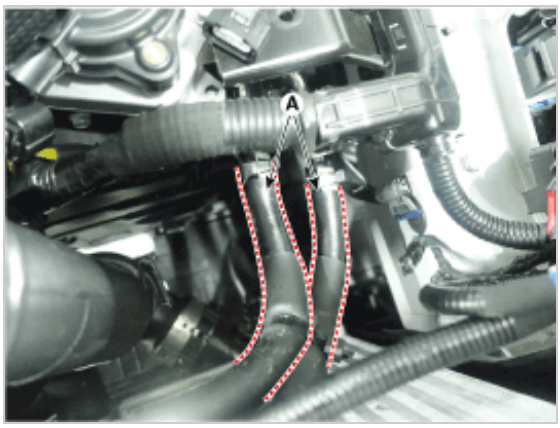
6. Loosen the bolt (A) and then separate the wiring (B).



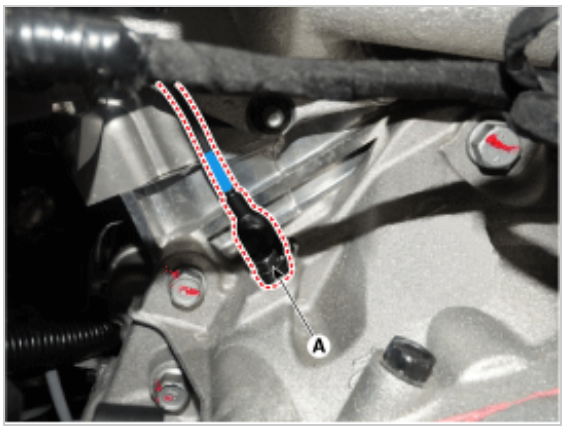
7. Remove the ground line (A).



8. Separate the ATF cooler hose (A).

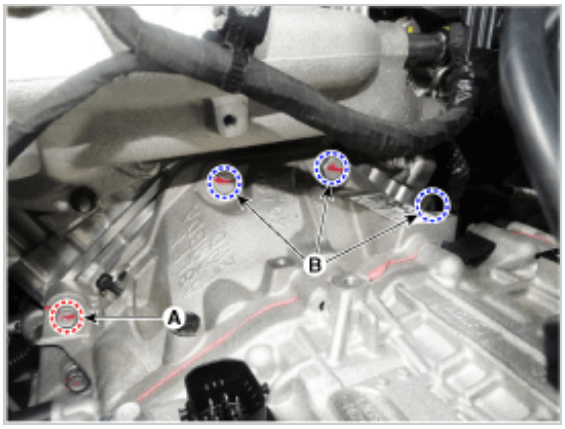


9. Remove the CKP sensor (A) after loosening the bolt.



10. Remove the transaxle upper mounting bolts (A, B).

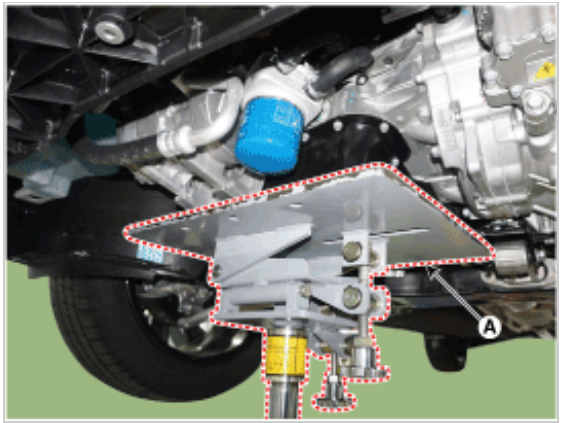
Tightening torque :
(A) 32.4 - 49.0 N.m (3.3 - 5.0 kgf.m, 23.9 - 36.2 lb-ft)
(B) 63.7 - 83.4 N.m (6.5 - 8.5 kgf.m, 47.0 - 61.5 lb-ft)



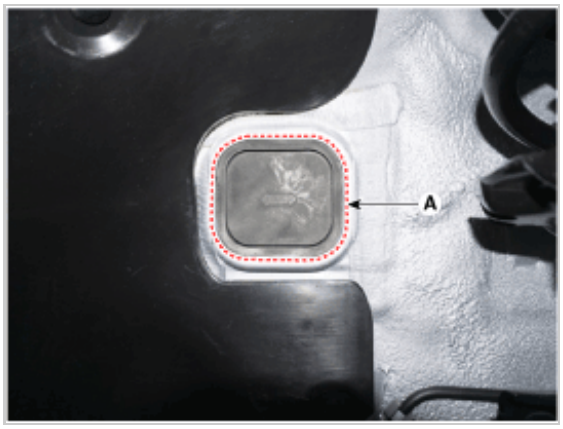
11. Assemble the engine support fixture use a (Beam SST No..: 09200 - 3N000, Supporter SST No..: 09200-2S000, Adaptor SST No..: 09200-2W000).
12. Using the engine support fixture, hold the engine and transaxle assembly safely.

⚠ CAUTION

- After installing SST, check that the tightening nuts are surely tightened.
- Support the jack (A) in the lower part of the engine safely when working underside of the transaxle.

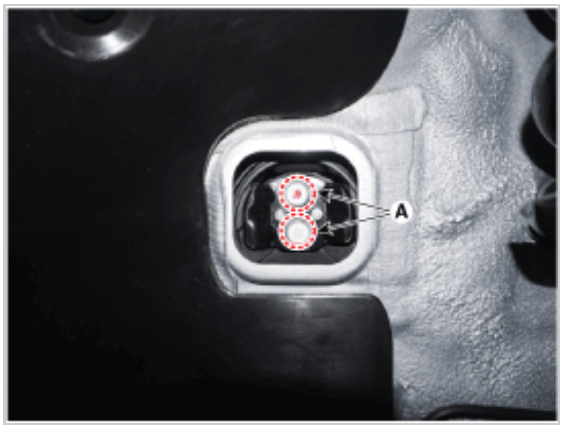


13. Remove the cover (A).



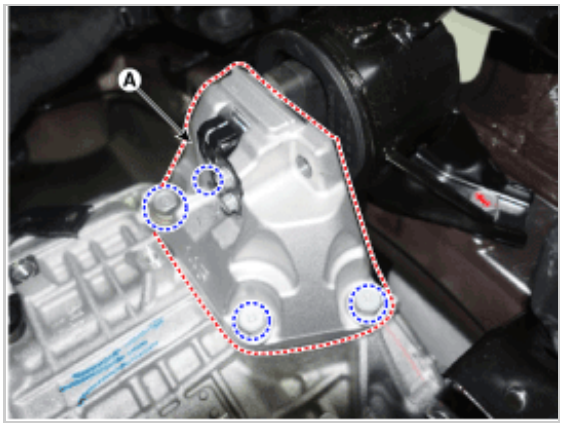
14. Remove the transaxle mounting bracket bolts (A).

Tightening torque :
107.9 - 127.5 N.m (11.0 - 13.0 kgf.m, 79.6 - 94.0 lb-ft)



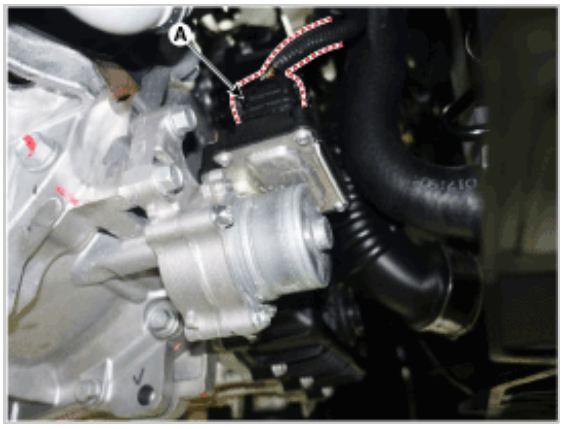
15. Loosen the transaxle support bracket mounting bolts and then removing the transaxle support bracket (A).

Tightening torque :
58.9 - 78.5 N.m (6.0 - 8.0 kgf·m, 43.4 - 57.9 lb-ft)



16. Remove the under cover.
(Refer to Engine Mechanical System - "Engine Room Under Cover")
17. Remove the sub frame.
(Refer to Suspension System - "Sub Frame")
18. Remove the driveshaft assembly.
(Refer to Driveshaft and Axle - "Front Driveshaft")
19. In case of 4WD vehicle, remove the transfer assembly.
(Refer to 4 Wheel Drive System-"Transfer Assembly")

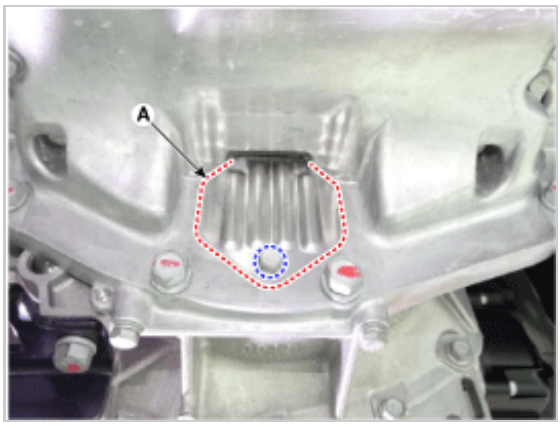
20. Disconnect the EOP(Electronic Oil Pump) connector (A).



21. Remove the dust cover (A).

Tightening torque :

39.2 - 46.1 N.m (1.0 - 1.2 kgf.m, 28.9 - 33.9 lb-ft)



22. Remove the torque converter mounting bolts (A) by rotating the crankshaft.

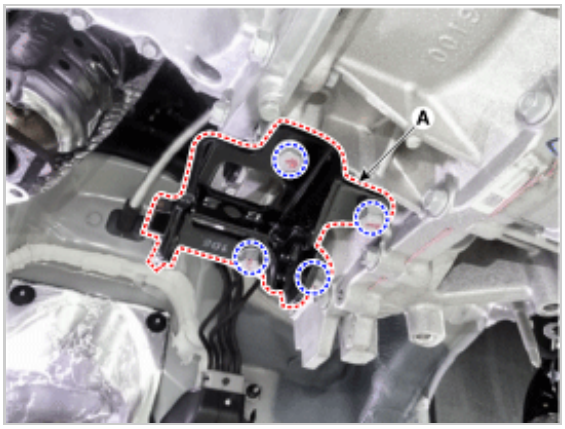
Tightening torque :

45.1 - 52.0 N.m (4.6 - 5.3 kgf·m, 33.3 - 38.3 lb-ft)

23. Remove the roll rod support bracket (A).

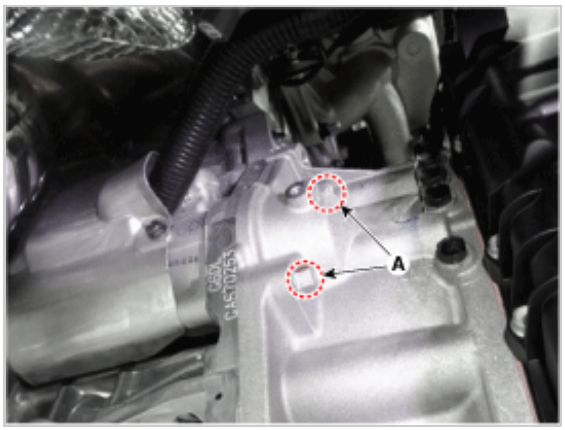
Tightening torque :

49.0 - 68.6 N.m (5.0 - 7.0 kgf·m, 36.2 - 50.6 lb·ft)



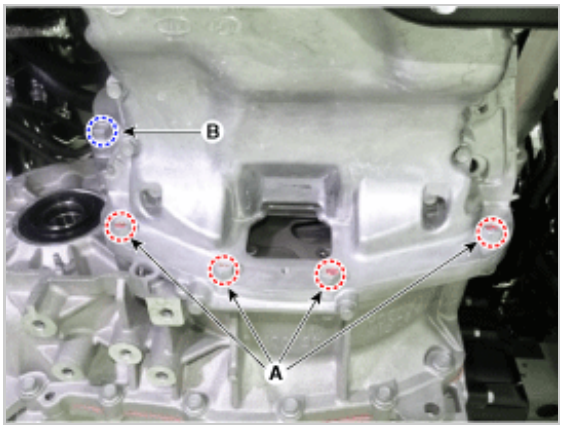
24. Support the transaxle safely with a jack.
25. Remove the starter mounting bolts (A).

Tightening torque :
49.0 - 63.7 N.m (5.0 - 6.5 kgf.m, 36.2 - 47.0 lb-ft)



26. Loosen the transaxle lower mounting bolts (A, B).

Tightening torque :
(A) 39.2 - 46.1 N.m (4.0 - 4.7 kgf.m, 28.9 - 34.0 lb-ft)
(B) 78.5 - 98.1 N.m (8.0 - 10.0 kgf.m, 57.9 - 72.3 lb-ft)



27. After separating the transaxle from the engine, remove the transaxle by lowering the jack slowly.

NOTICE

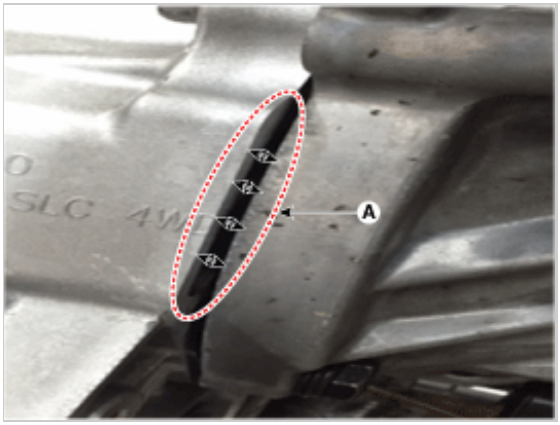
- Be careful not to damage other nearby systems or parts when removing the transaxle assembly.

- Installation

1. To install, reverse the removal procedure.

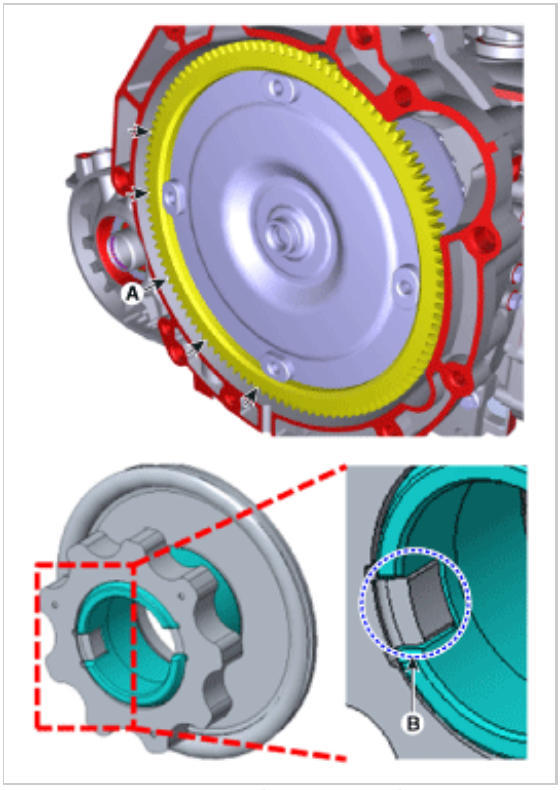
⚠ CAUTION

1) Before reassembling the automatic transaxle to the engine assembly, make sure that there is no gap (A) between automatic transaxle and engine assembly as below illustration. Do not reassemble the automatic transaxle to the engine assembly when this gap (A) exist.

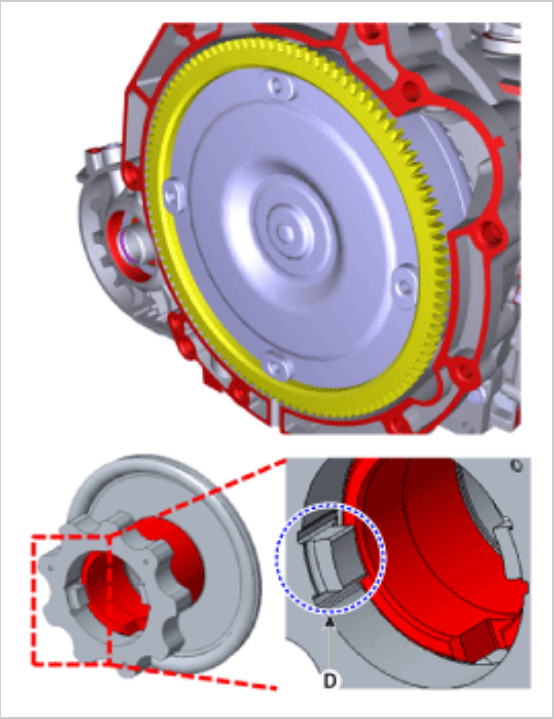


2) While there is a gap, It would be meaning that the key of oil pump gear is not assembled properly to the torque converter hub. In this case, remove the automatic transaxle assembly and then reinstall the torque converter to automatic transaxle assembly according to the key shape of oil pump gear.

[Correct Assembly (A) - Oil Pump Key Part (B) Engaged Properly]



[Incorrect Assembly (C) - Torque Converter Protruded due to Interference with the Oil Pump Key Part (D)]



3) If the mounting bolt is tightened forcibly in spite of a gap, key of oil pump gear will be damaged or broken. In this case, replace the automatic transaxle assembly.

NOTICE

- Follow the separted each procedure as below according to reinstallation or replacing with a new automatic transaxle.

2. In case of the reinstallation.

(1) Replace the oil seal with a new one when ATF leak occurred because of differential oil seal damage.

NOTICE

- When installing the new oil seal, use the special service tool.

(2) Check the ATF level after refilling the automatic transaxle with fluid.
(Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")

(3) Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

NOTICE

- Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

3. In case of the replacing with a new automatic transaxle.

NOTICE

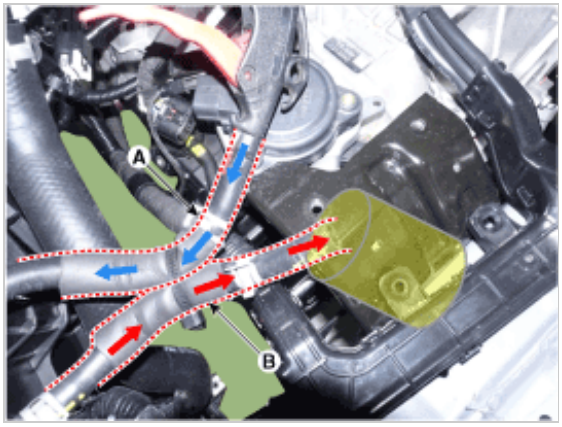
- New automatic transaxle is already filled with specified quantity ATF.
  For that reason, it does not necessary to refill and check the ATF but the remaining ATF inside of ATF cooler have to be removed.

(1) Set the air blow gun in front of the ATF cooler hose (A).

(2) Set the cup in front of the ATF cooler hose (B).

(3) Remove the remaining ATF by blowing air into ATF cooler hose.

(4) Install the ATF cooler hose (A) and (B).

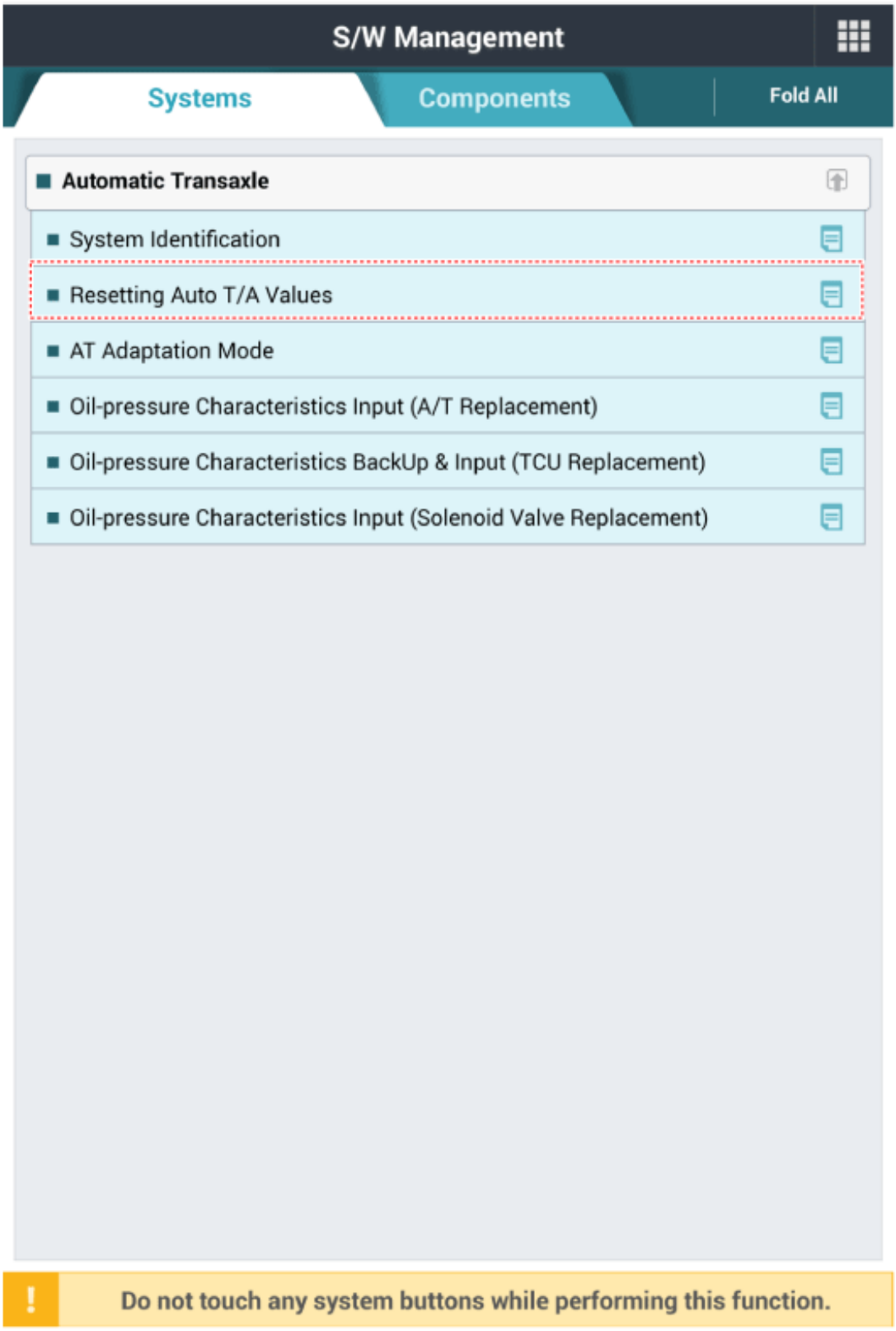


(5) Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

NOTICE

- Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

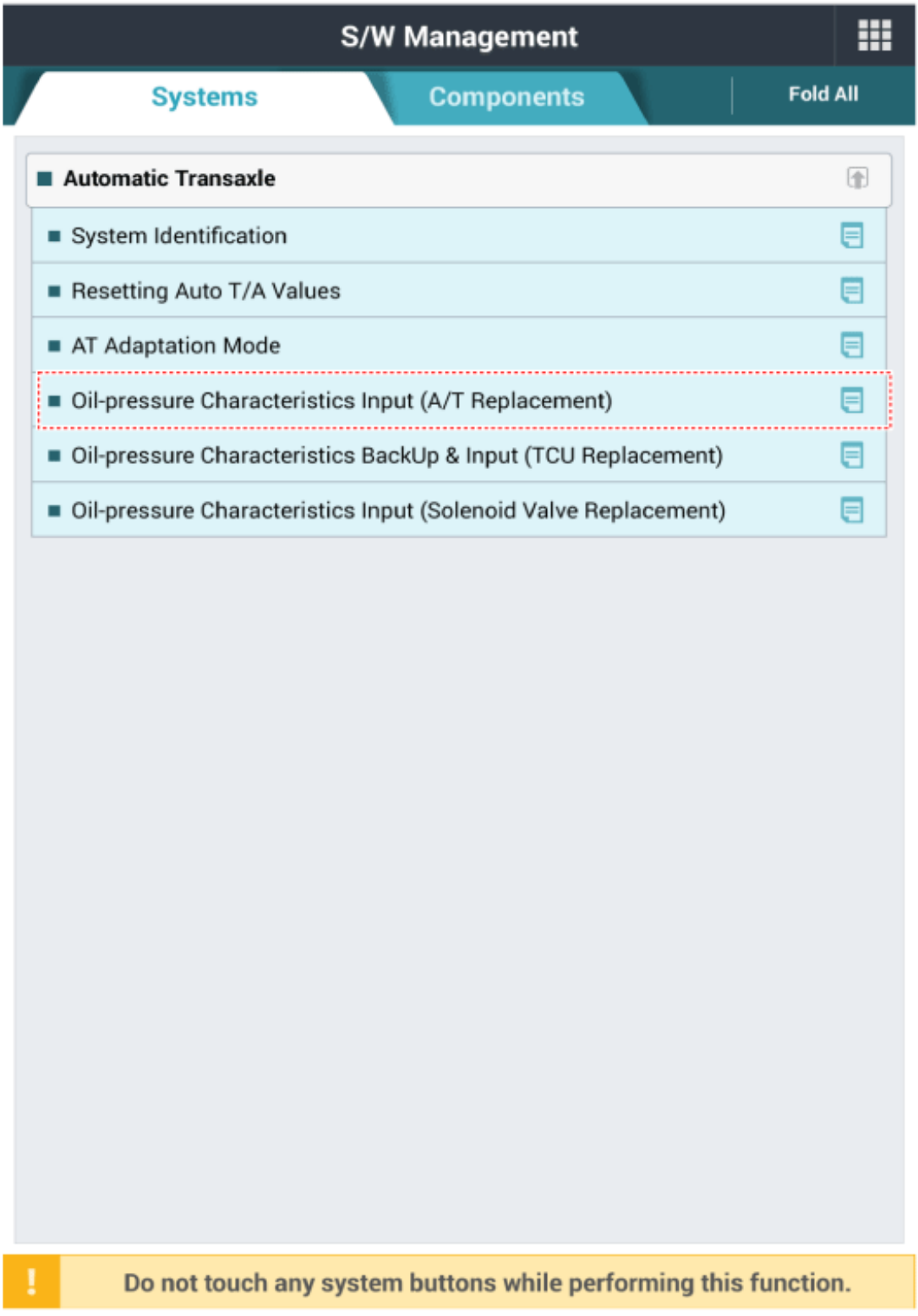
(6) Reset the automatic transaxle adaptive values using the diagnostic tool.



(7) Perform the oil pressure characteristics input procedure.

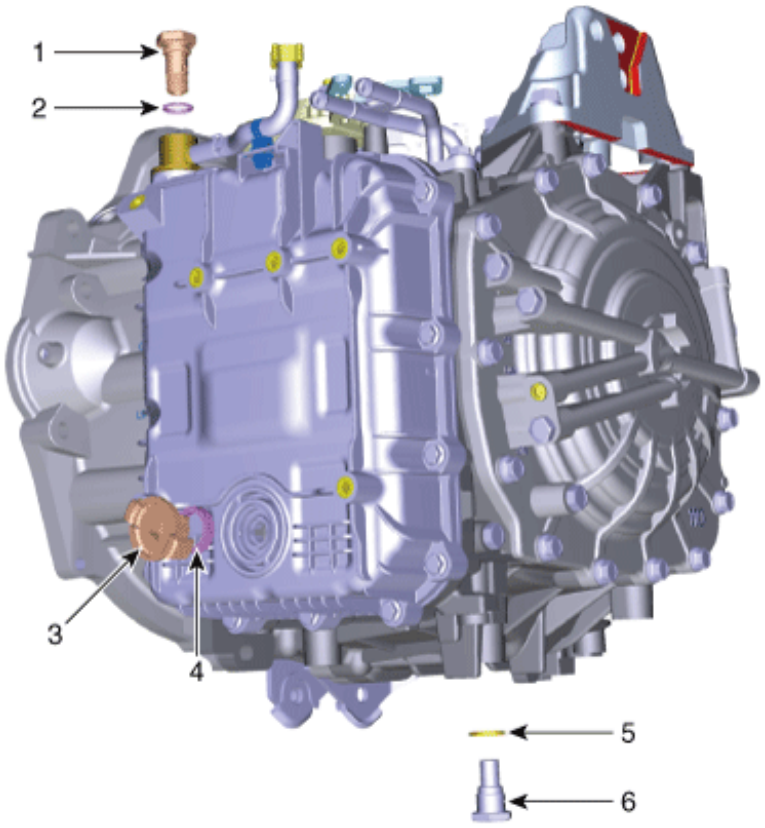
- Oil pressure characteristics (bar code) location

- Oil-pressure characteristics input (Transaxle exchange)



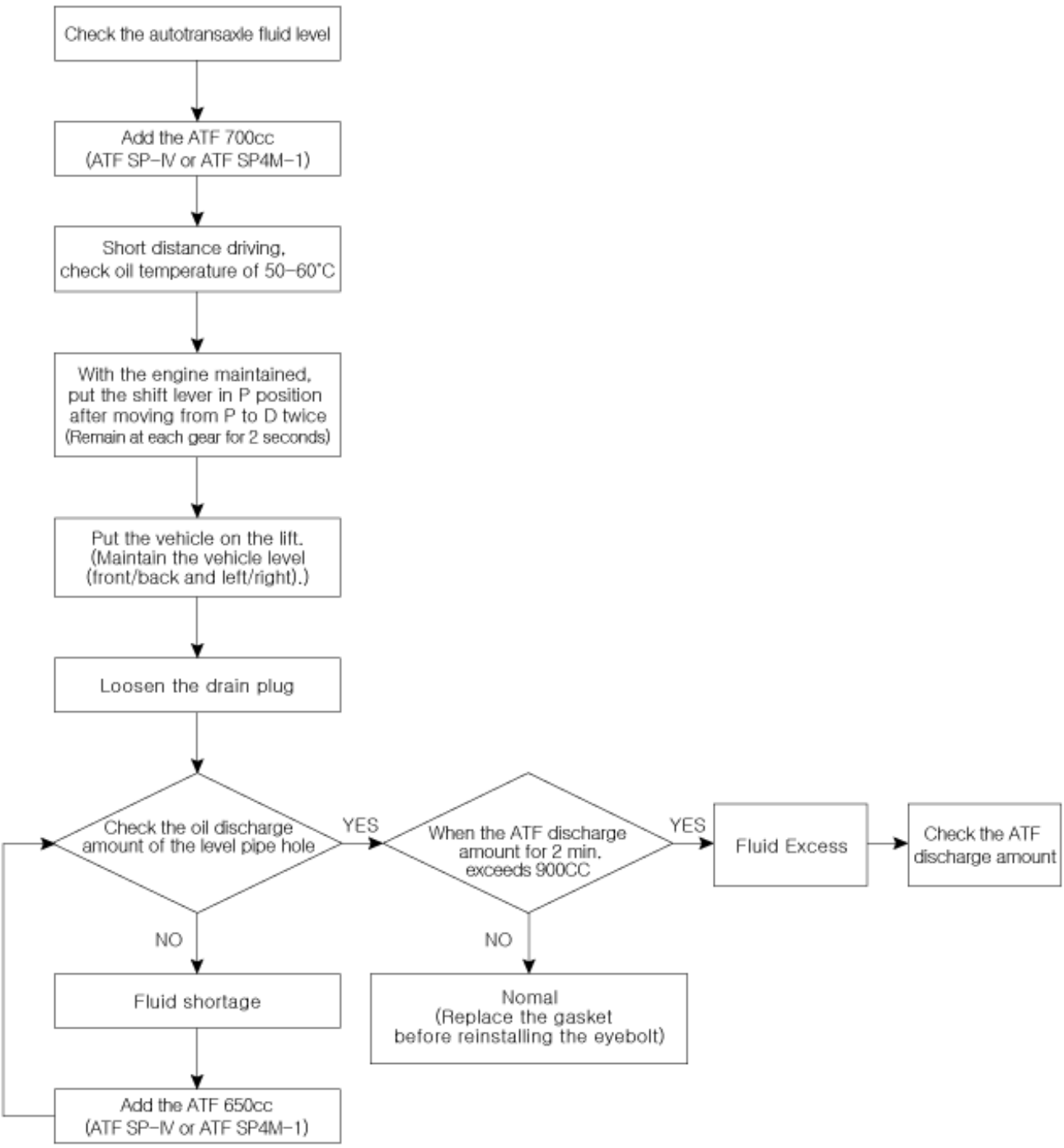
(8) Perform the TCM adaptive values learning procedure.
(Refer to Automatic Transaxle Control System - "Repair Procedures")

- Components Location



1. ATF Injection plug (Eyebolt)
2. ATF injection plug gasket
3. ATF level check plug
4. ATF level check plug gasket
5. Drain plug gasket
6. Drain plug

- Automatic Transaxle Fluid (ATF) Level Check



⚠ CAUTION

- When checking the oil level, be careful not to enter dust, foreign matters, etc. from fill hole.
- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

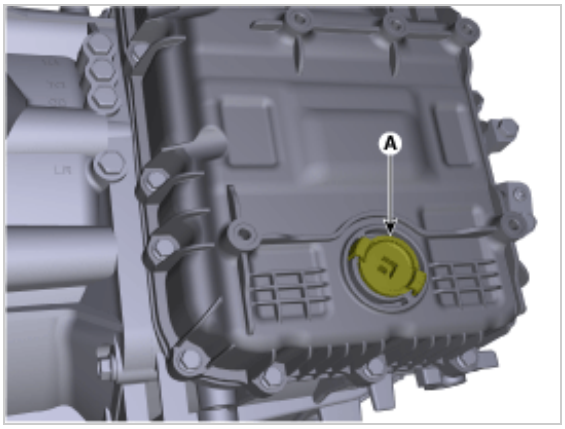
1. Remove the eyebolt (A).

2. Add ATF SP-IV or SP4M-1 700cc to the ATF injection hole (A).

3. Start the engine.
   (Don’t step on brake and accelerator simultaneously.)
4. Confirm that the temperature of the automatic transaxle oil temperature sensor is 50 - 60°C (122 - 140°F) with the diagnostic tool.
5. Shift the select lever slowly from “P” to “D”, then “D” to “P” and repeat one more at idle.

> **⚠ CAUTION**
> • Pause at each gear position more than 2 seconds.

6. Raise the vehicle, and make sure it is securely supported.
7. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
8. Remove the ATF level check plug (A) from the valve body cover.



⚠ CAUTION

- At this time, the vehicle must be at a level state.
- When checking the oil level, be careful not to enter dust, foreign matters, etc. from fill hole.

9. If the ATF flows out of the overflow plug in thin steady stream, the ATF level is correct.
   Then finish the procedure and tighten the ATF level check plug.

NOTICE

- Excess : Drain quantity exceed 900cc for tow minutes. {50 - 60°C (122 - 140°F)}
- Shortage : No ATF flows out of the overflow plug.

⚠ CAUTION

- Replace the gasket before reinstalling the ATF level check plug.
- Turn the oil level check plug clockwise until it is set.
- If there is no damage at the automatic transaxle and the ATF cooler, the ATF cooler hose, transaxle case, valve body tightening state are normal, ATF must drip out after performing above 1 to 7 procedures. After performing above 1 to 7 procedures, if the oil doesn't drip out, inspect the automatic transaxle assembly.

10. Install the under cover.
    (Refer to Engine Mechanical System - "Engine Room Under Cover")
11. Put down the vehicle with the lift and then tighten the eyebolt.

Eyebolt tightening torque :
4.9 - 5.9 N.m (0.5 - 0.6 kgf.m, 3.6 - 4.3 lb.ft)

⚠ CAUTION

- Replace the gasket (A) before reinstalling the eyebolt.

- Replacement

NOTICE

ATF of 8 speed automatic transaxle doesn't be replaced. But, if the vehicle is severe use or business use, replace ATF every 60,000 miles for severe usage.

Severe usage is defined as

- Driving in rough road (Bumpy, Gravel, Snowy, Unpaved road, etc).
- Driving in mountain road, ascent / descent.
- Repetition of short distance driving.
- More than 50% operation in heavy city traffic during hot weather above 30°C (86°F) .
- Police, Taxi, Commercial type operation or trailer towing, etc.

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

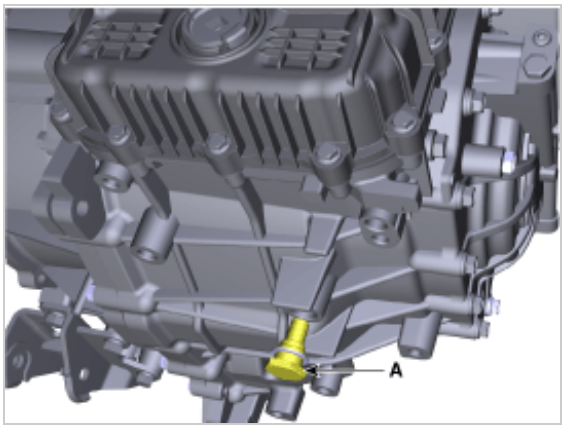
1. Lift the vehicle, and then remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
2. Remove the drain plug (A) and reinstall the drain plug after draining ATF totally.

⚠ CAUTION

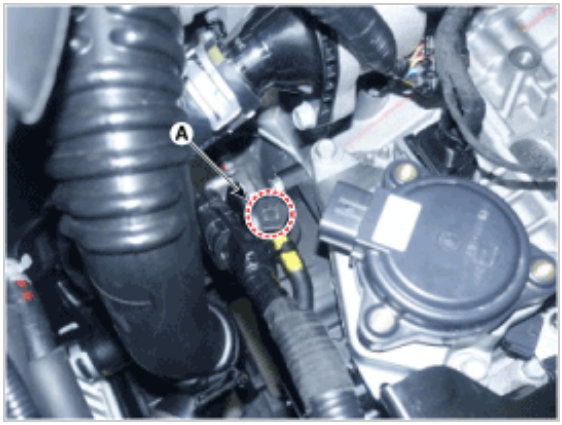
- Replace the gasket before reinstalling the drain plug.

Drain plug tightening torque :

33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



3. Put down the vehicle with the lift and then remove the eyebolt (A).
4. Fill the ATF about 5 liters to the injection hole.



5. Check the ATF level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid (ATF)")
6. Then finish check the ATF level procedure and install the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
7. Put down the vehicle with the lift and then tighten the eyebolt.

Eyebolt tightening torque :
4.9 - 5.9 N.m (0.5 - 0.6 kgf.m, 3.6 - 4.3 lb.ft)

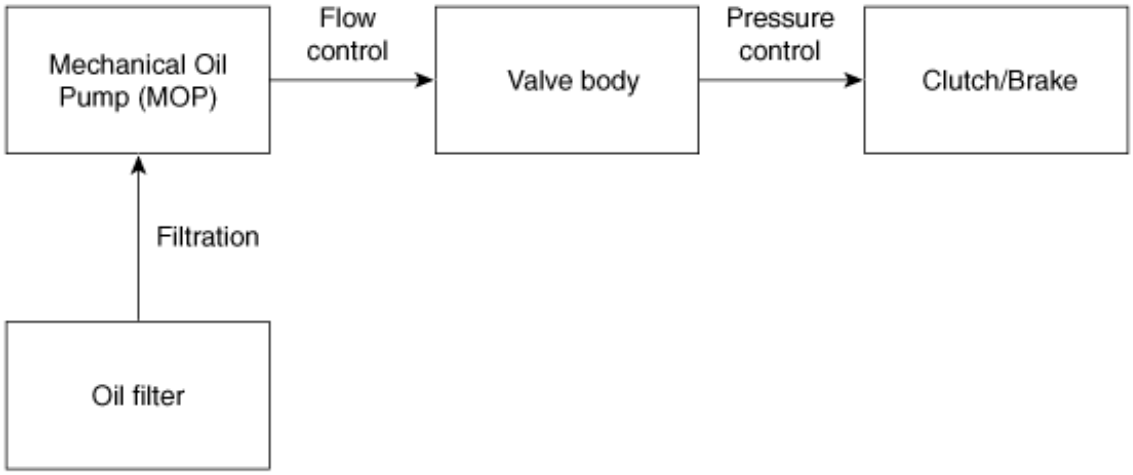
⚠ CAUTION

- Replace the gasket (A) before reinstalling the eyebolt.

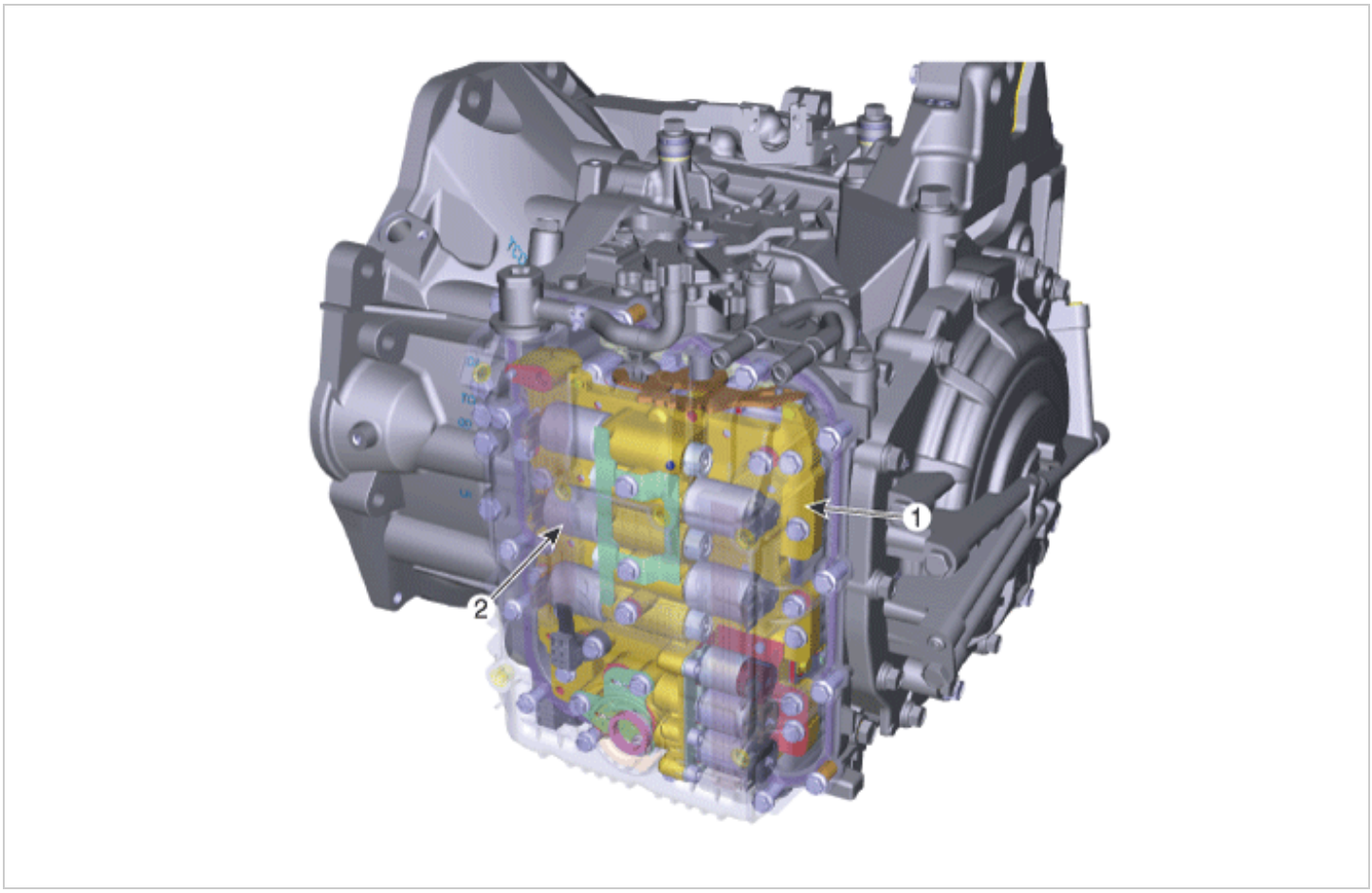
- Description

- The hydraulic system consists of a valve body, an oil filter and an oil pump.
- The oil pump is powered by the engine. ATF passes through the oil filter and gets distributed along the oil channels.
- The oil becomes highly pressurized as it exits the oil pump and passes through the line pressure valve before being fed to the clutch & brake control valve, clutch, and brakes.
- TCM controls the hydraulic pressure using solenoid valves and controls clutch and brake operations.

Flow of the hydraulic system



- Components Location



1. Valve body assembly
2. Solenoid valve

- Removal

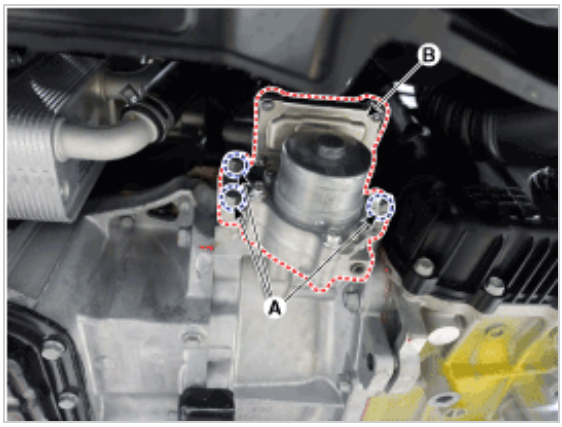
⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
3. Disconnect the EOP connector (A).

4. Remove the EOP (B) after removing the bolts (A).

Tightening torque :
20.6 - 26.5 N.m (2.1 - 2.7 kgf.m, 15.2 - 19.5 lb-ft)



- Installation

1. To install, reverse the removal procedure.

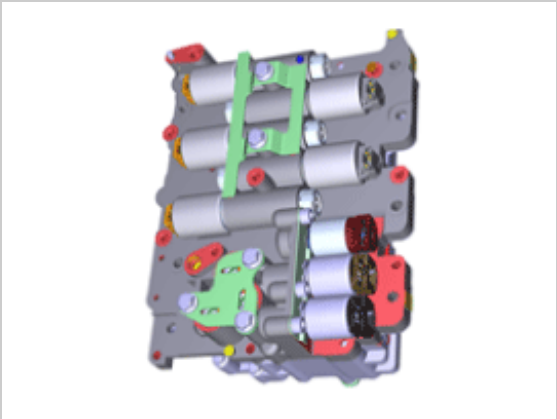
⚠ CAUTION
- The existing o-rings must be replaced with a new one. (Do not reuse it.)
- Apply ATF to new O-Ring before insert EOP to transaxle.

2. Check the ATF level after refilling the automatic transaxle with fluid.
(Refer to Automatic Transaxle System - "Automatic Transaxle Fluid(ATF)")

⚠ CAUTION
- After the installation, start the engine and then check if there are any leakages from the EOP connection.

- Description

- The valve body mounted is inside the transaxle.
- The valve body is essential to automatic transaxle control and consists of various valves used to control the oil feed from the oil pump.
- Specifically, these valves consist of pressure regulator valves, oil redirection valves, shift valves, and manual valves.
- The body also features electronic solenoid valves that ensure smooth gear changes.



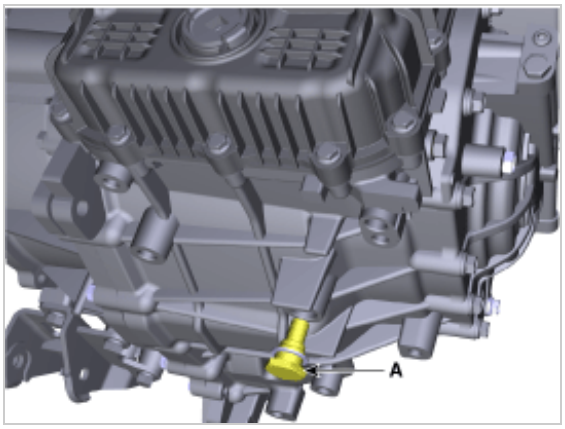
- Removal

⚠ CAUTION

- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.
- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Engine Mechanical System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

Tightening torque :
33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

7. Loosen the fixing bolt (A) and then removing the bracket.

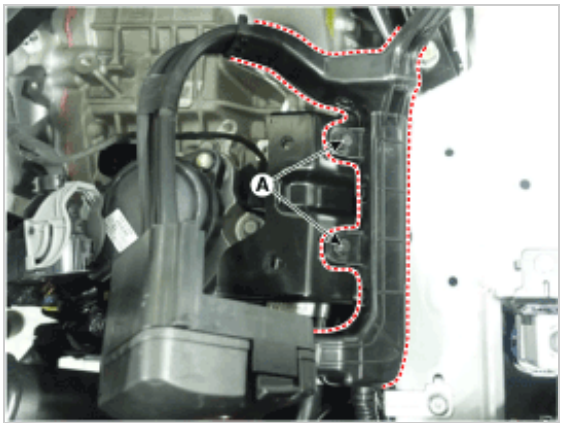
Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

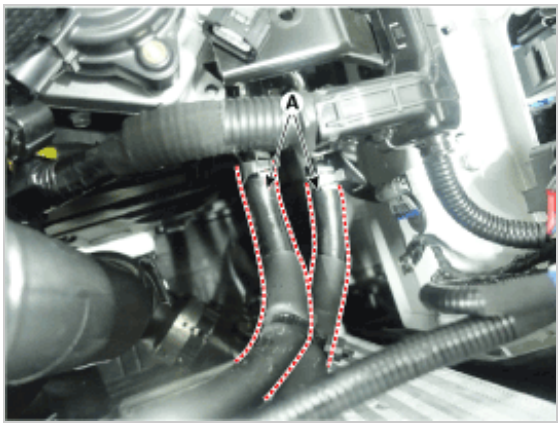
8. Loosen the fixing bolts (A) and then removing the bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Separate the ATF cooler hose (A).



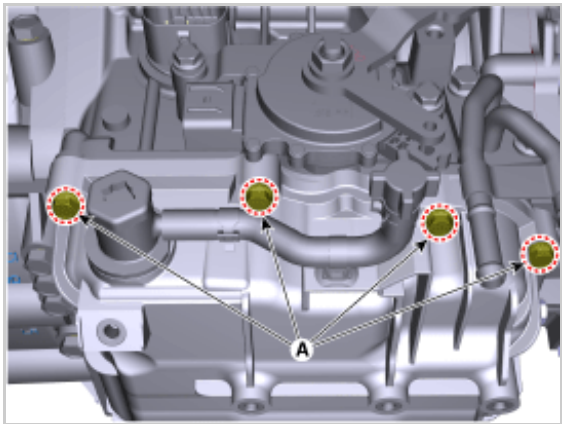
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



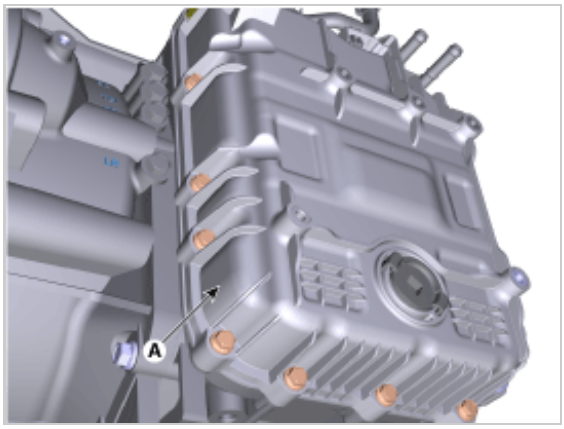
11. Remove the valve body cover (A) after removing the bolts.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

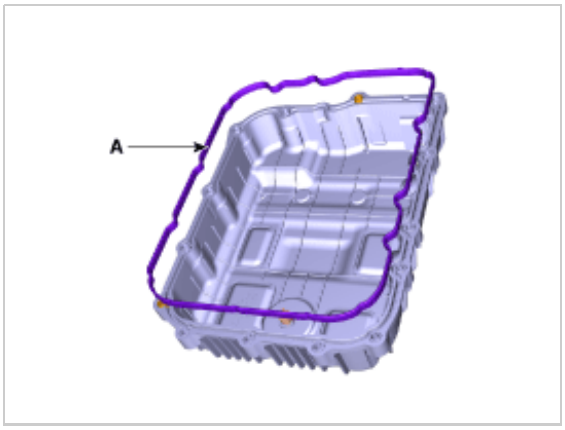
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



CAUTION

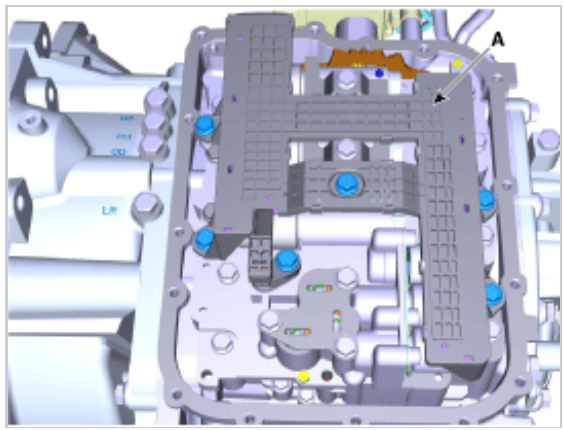
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then Separate the main harness (A).

Tightening torque :

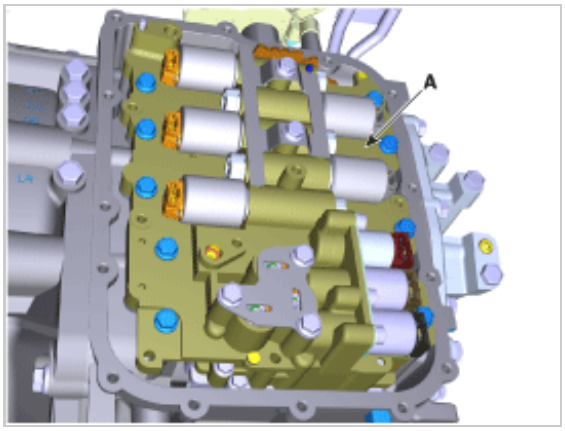
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



13. Remove the valve body assembly (A).

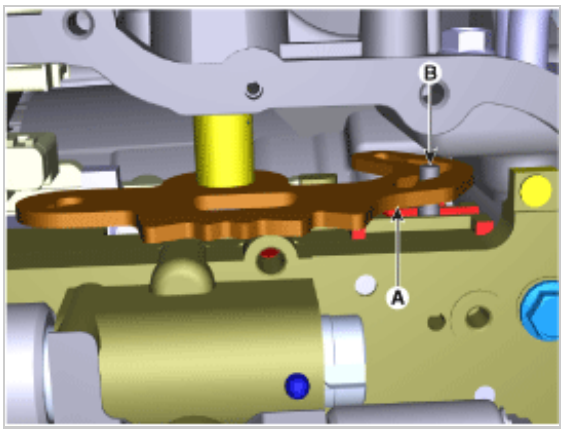
Tightening torque :

(A) 9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



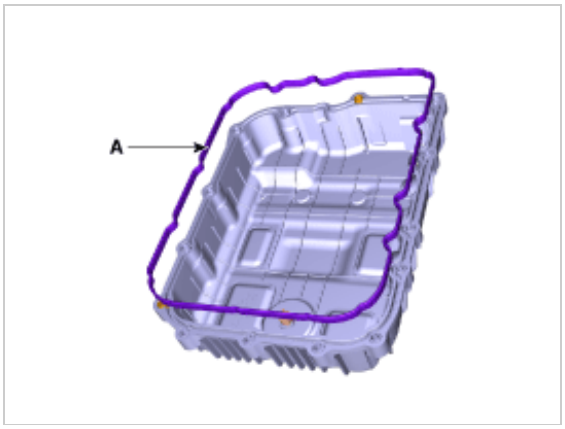
CAUTION

- Attach the manual pin (B) to the detent lever (A) and assemble the valve body.



- Installation

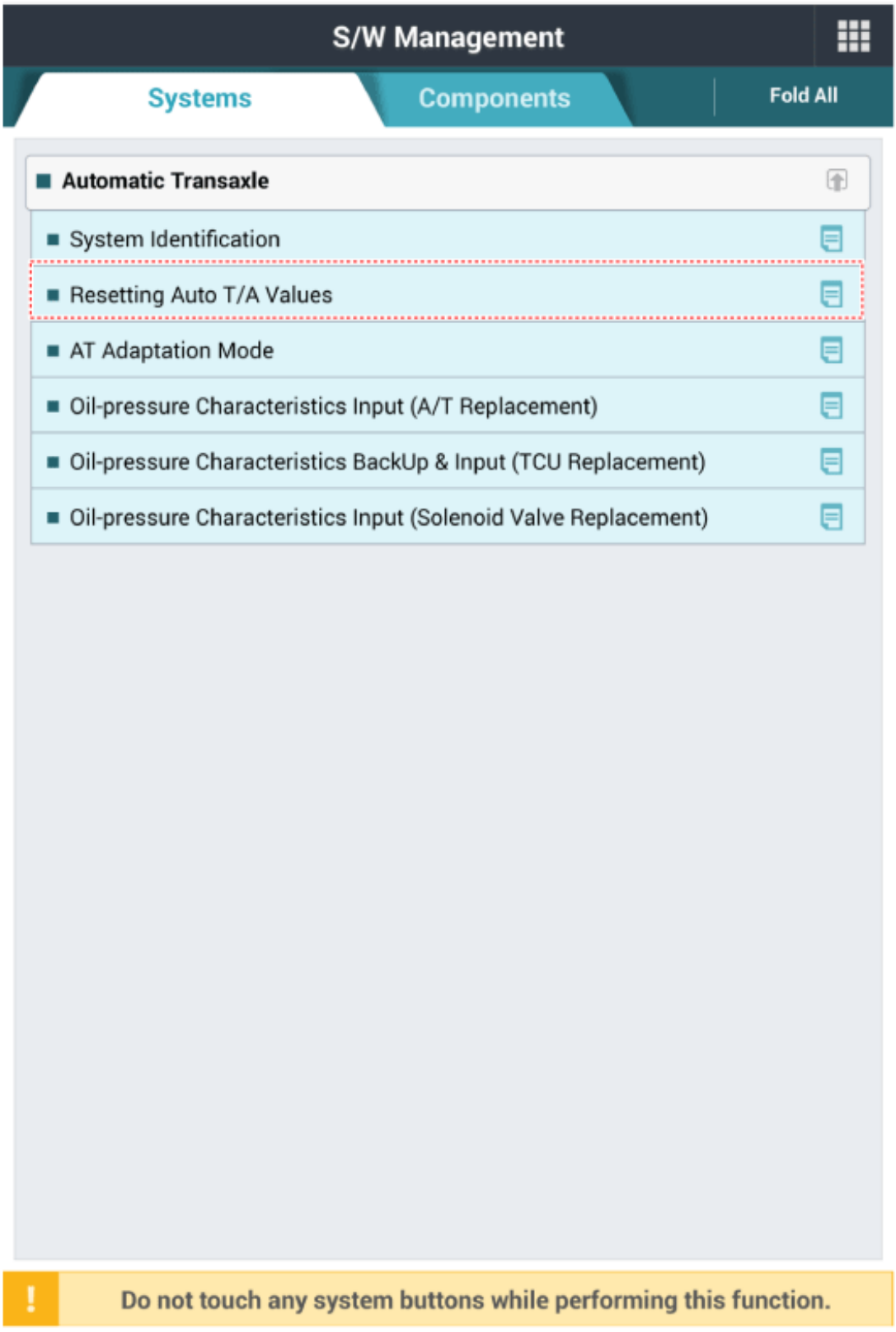
1. To install, reverse the removal procedures.
2. The existing valve body cover gasket (A) must be replaced with a new one. (Do not reuse it.)



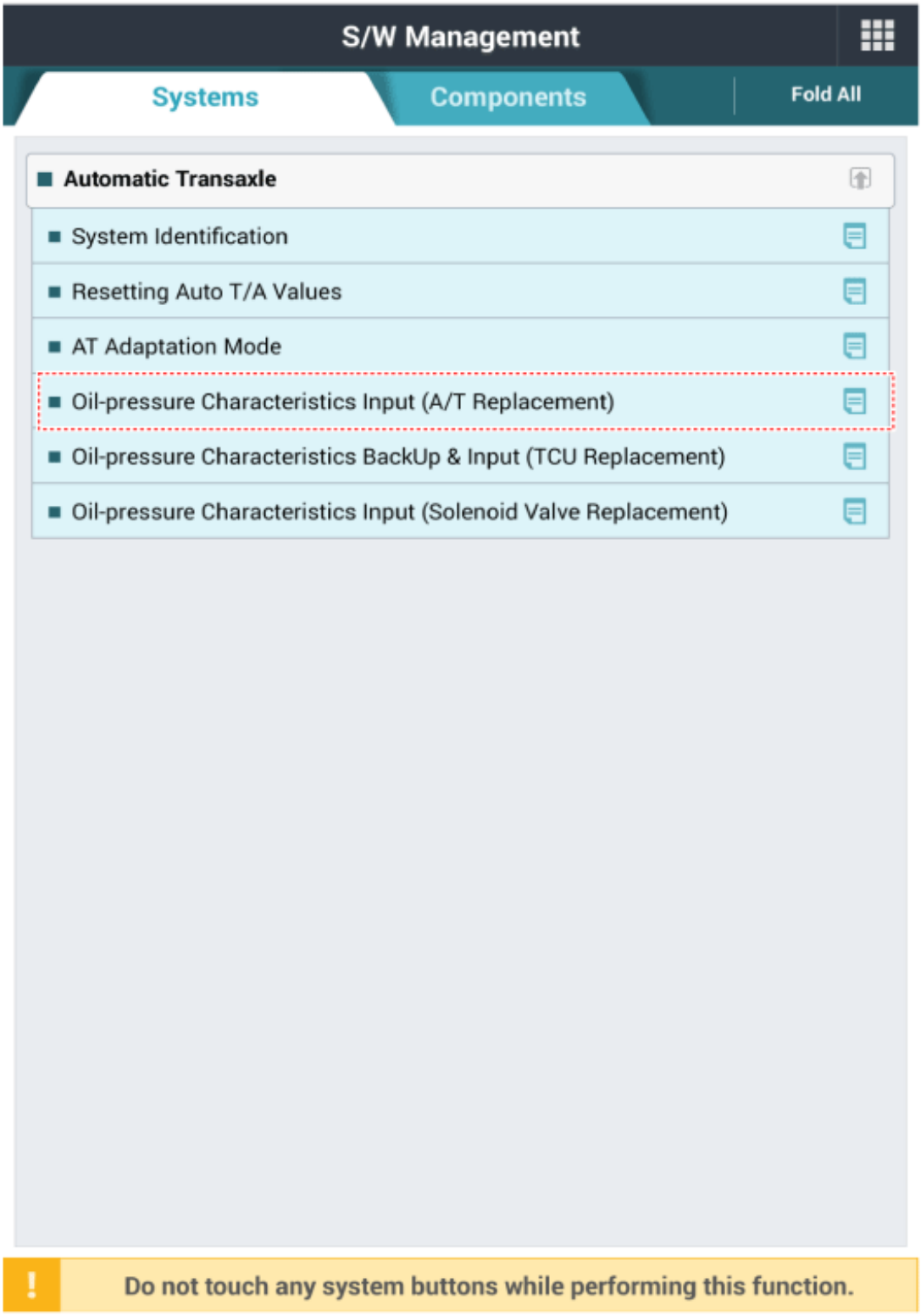
3. Perform the procedures below after in replacing the valve body assembly.
4. Refill the automatic transaxle with fluid.
   (Refer to Hydraulic System - "Fluid")
5. Add the coolant. [In case by ATF warmer apply]
   (Refer to Engine Mechanical System - "Coolant")
6.

Clear the diagnostic trouble codes (DTC) using the diagnostic tool. Disconnecting the battery negative terminal will not clear the DTCs. Clear DTCs using the diagnostic tool at all times.

7. Reset the automatic transaxle adaptive values using the diagnostic tool.



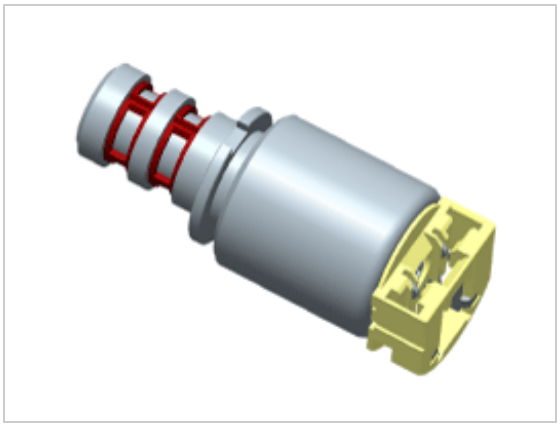
8. Perform the oil pressure characteristics input procedure using the diagnostic tool.



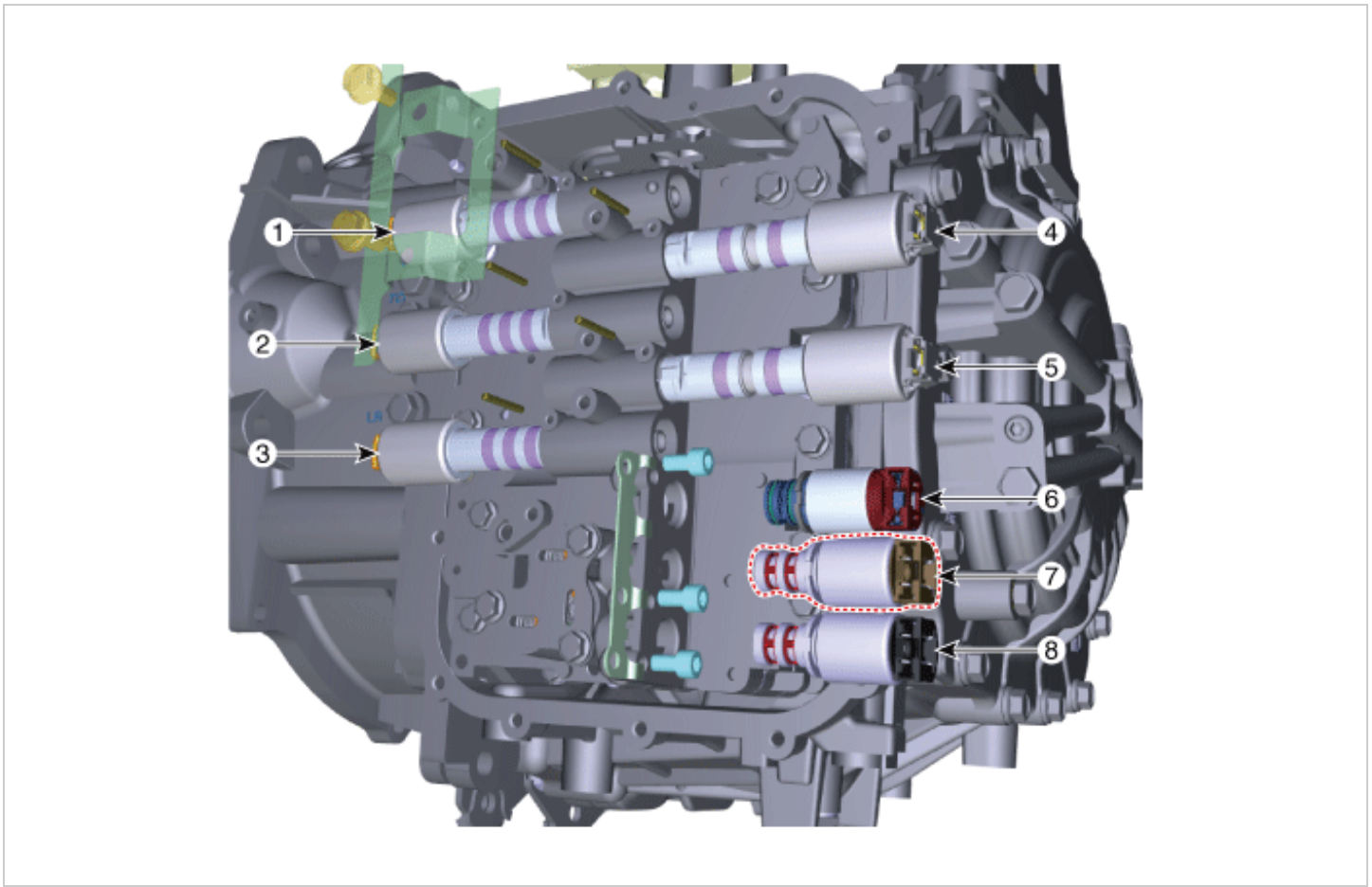
9. Perform the TCM adaptive values learning procedure.
   (Refer to Automatic Transaxle Control System - "Repair procedures")
10. After installing, check for leakage of fluid from hose connection during engine start.

- Description

- Torque converter control solenoid valve (T/CON_VFS) is attached to the valve body.
- This variable force solenoid valve indirectly controls the hydraulic pressure inside the torque converter.



- Components Location



1. 28 Brake control solenoid valve (28/B_VFS)
2. 46 Clutch control solenoid valve (46/C_VFS)
3. 37R Clutch control solenoid valve (37R/C_VFS)
4. UD Clutch control solenoid valve (UD/C_VFS)
5. OD Clutch & LR Brake control solenoid valve (OD/C & LR/B_VFS)
6. SS-A solenoid valve (SS-A_ON/OFF)
7. Torque converter control solenoid valve (T/CON_VFS)
8. Line pressure control solenoid valve (LINE_VFS)

- Specification

Clutch & Brake Control VFS [T/con]

▷ Control type : Normally Low

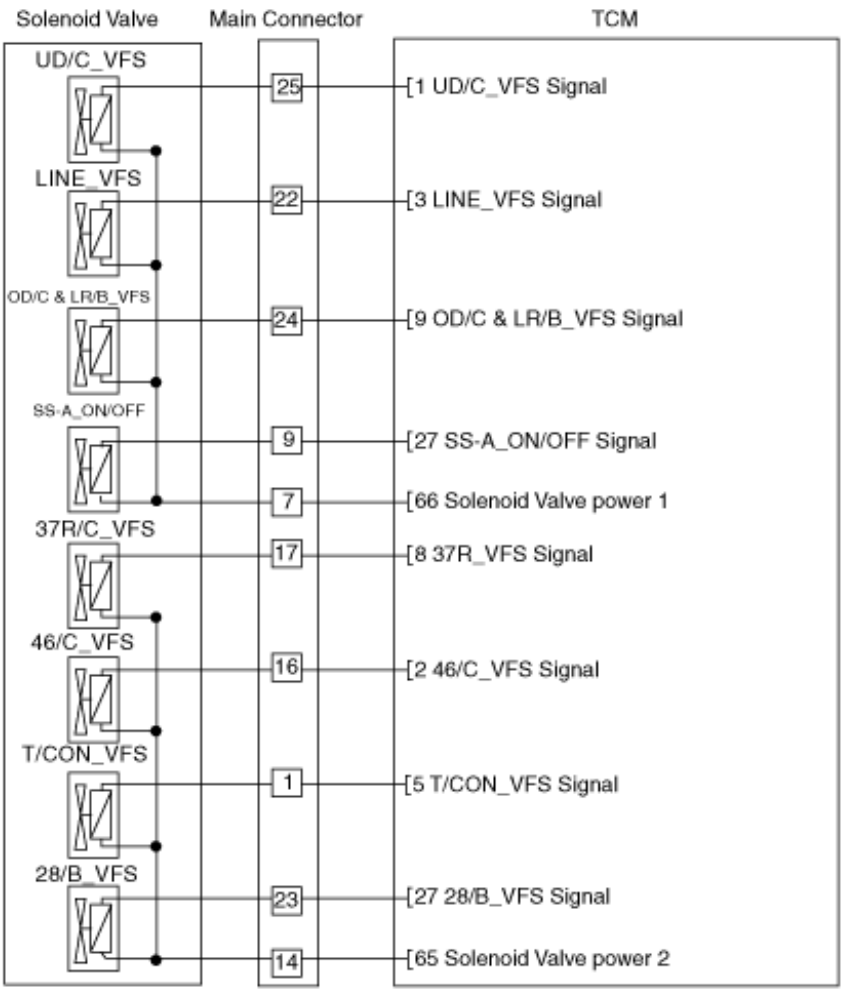
Item	Specification
Control pressure (kpa (kgf/cm, psi))	0 - 519.75 (0 - 5.3, 0 - 75.38)
Current (mA)	0 - 850
Internal resistance (Ω)	5.1 ± 0.3

▷Operation of the solenoid valve

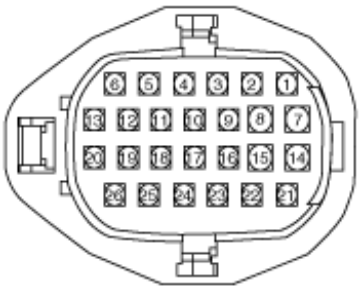
Division	Solenoid valve
	T/CON_VFS
P	
R	
N	
1	◎
2	◎
3	◎
4	◎
5	◎
6	◎
7	◎
8	◎
Remark	● : Connected
	◎ : Variable connected

- Circuit Diagram

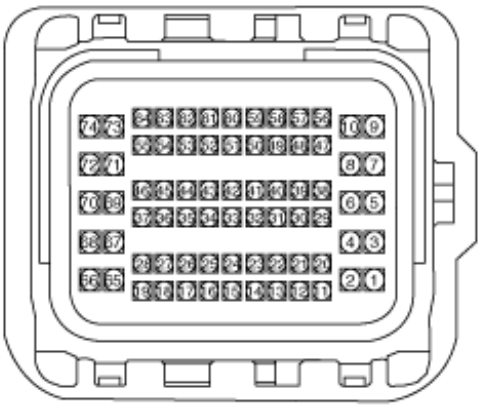
[Circuit Diagram]



[Connector]



[Main Connector]



[TCM Connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

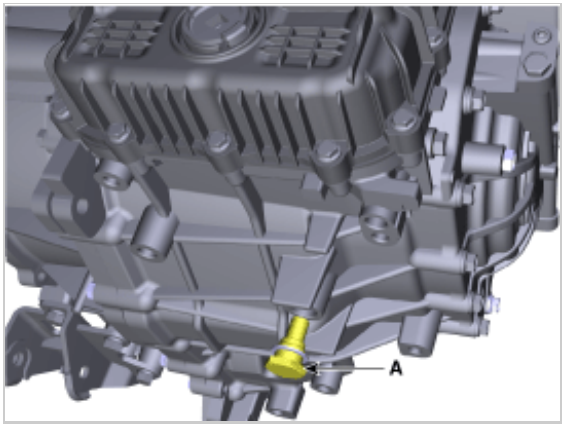
- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Cooling System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

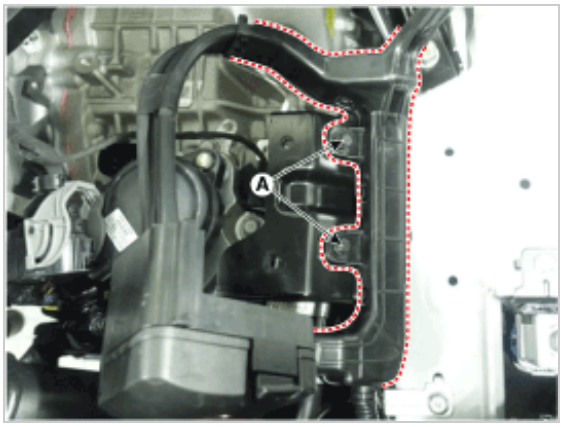
7. Loosen the bolts (A) and then removing the wiring bracket.

   Tightening torque :
   9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

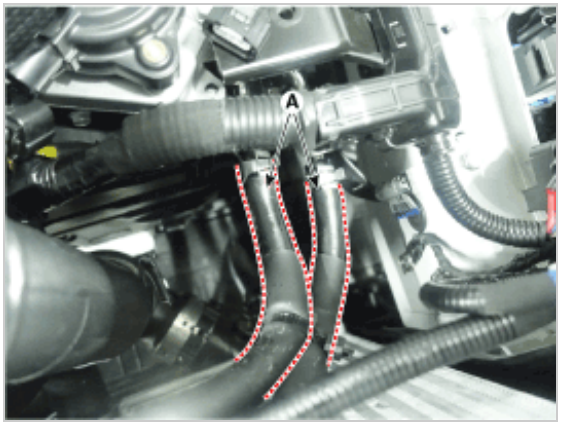
8. Loosen the bolts (A) and then removing the battery wiring bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Remove the ATF cooling hose (A).



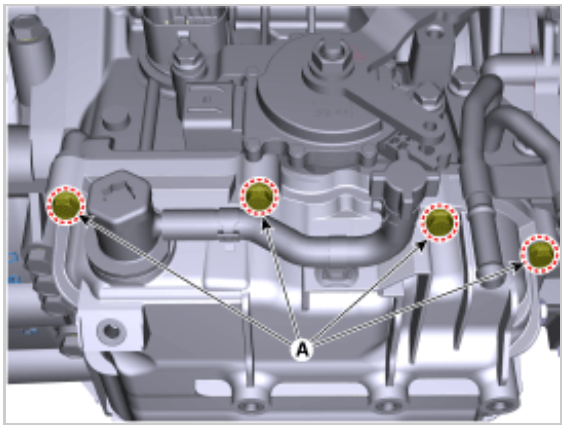
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper mounting bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



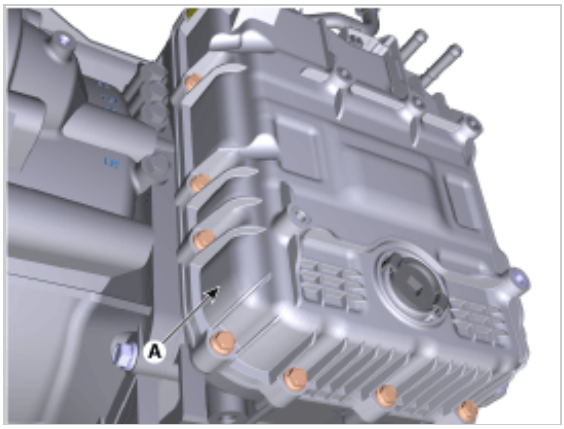
11. Loosen the bolts and then removing the valve body cover (A).

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

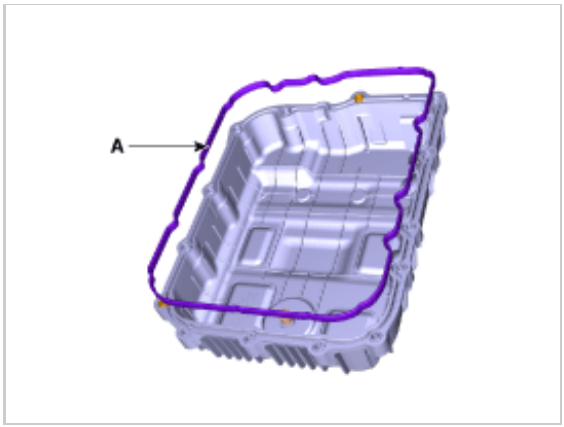
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

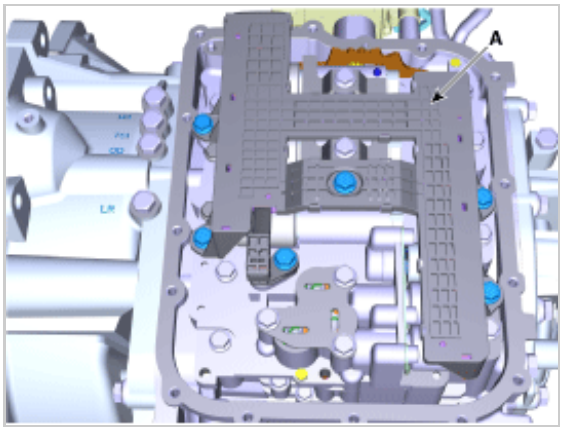
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then removing the main harness (A).

Tightening torque :

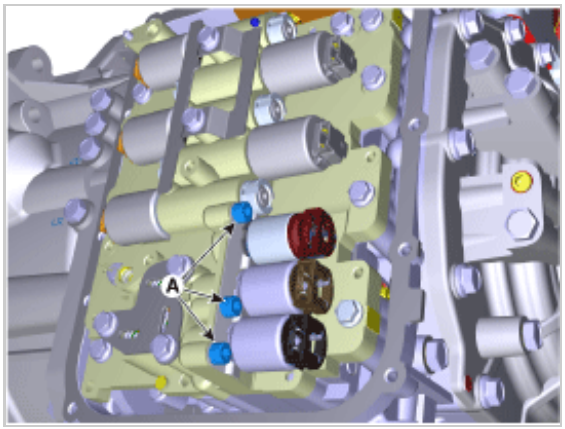
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



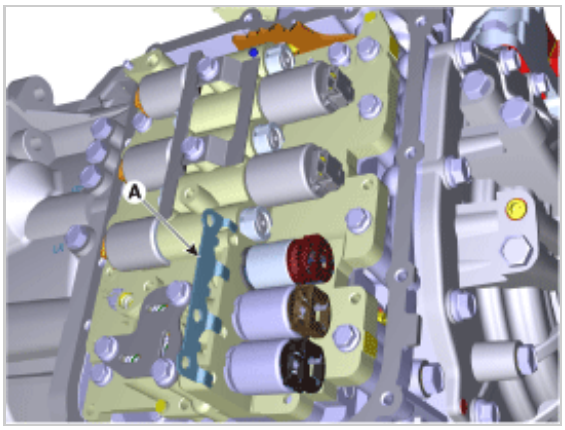
13. Loosen the support bracket mounting bolts (A).

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



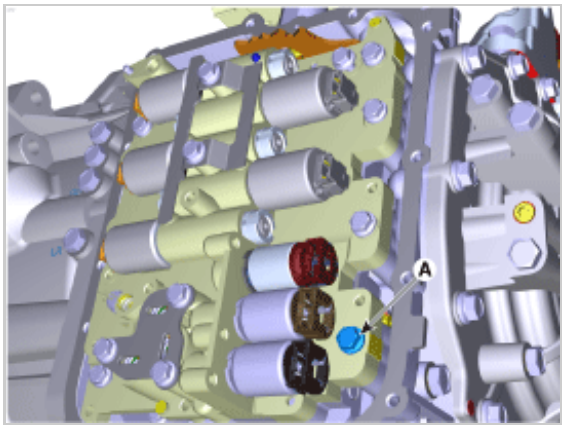
14. Remove the support bracket (A).



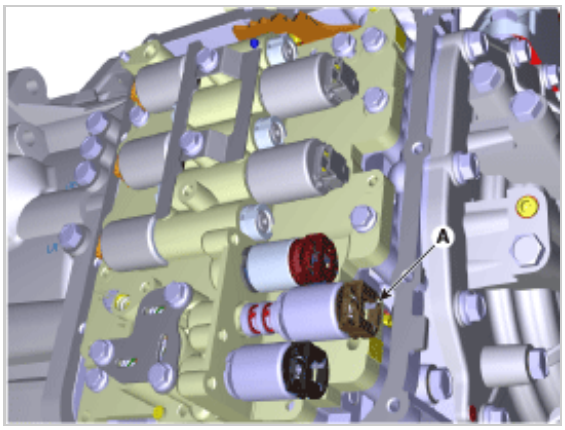
15. Loosen the bolt (A).

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



16. Remove the torque converter control solenoid valve (A).



- Installation

1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")
3. Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

> **Information**
> - Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

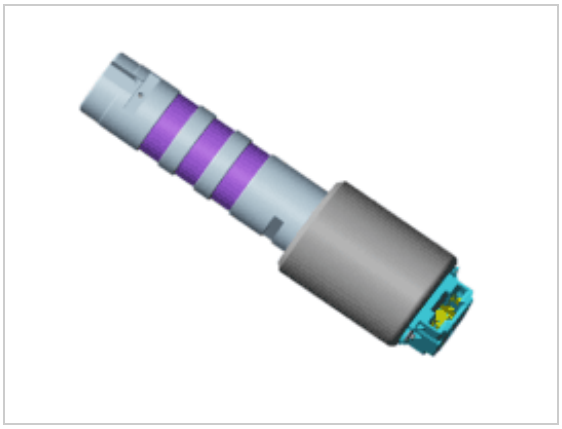
4. In order to prevent start delay and gear shift shock during acceleration and start, perform TCM learning after replacing the solenoid valve.
   (Automatic Transaxle Control System - "Repair Procedures")

> **CAUTION**
> - After ATF level check or exchange, be sure to remove residual ATF on transaxle case.
>   (Be especially sure to remove residual ATF between automatic transaxle case and valve body cover)

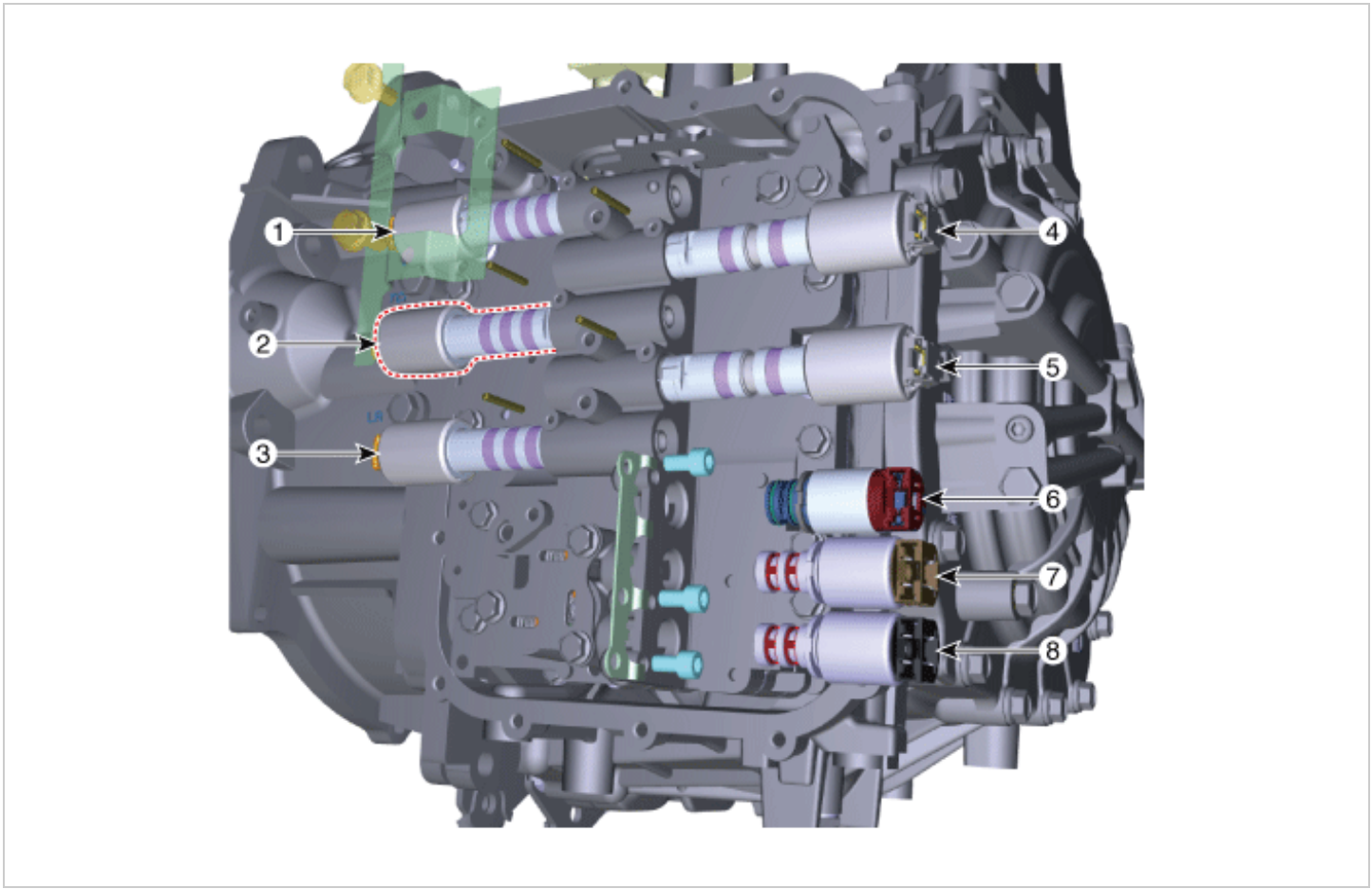
Automatic Transaxle System (A8LF1)

- Description

- When TCM supplies variable current to solenoid valve, hydraulic pressure of 46 clutch is controlled directly by solenoid valve.
- 46 Clutch control solenoid valve is a Variable Force Solenoid (VFS) type.



- Components Location



1. 28 Brake control solenoid valve (28/B_VFS)
2. 46 Clutch control solenoid valve (46/C_VFS)
3. 37R Clutch control solenoid valve (37R/C_VFS)
4. UD Clutch control solenoid valve (UD/C_VFS)
5. OD Clutch & LR Brake control solenoid valve (OD/C & LR/B_VFS)
6. SS-A solenoid valve (SS-A_ON/OFF)
7. Torque converter control solenoid valve (T/CON_VFS)
8. Line pressure control solenoid valve (LINE_VFS)

- Specification

Clutch & Brake Control VFS

▷ Control type : Normally Low

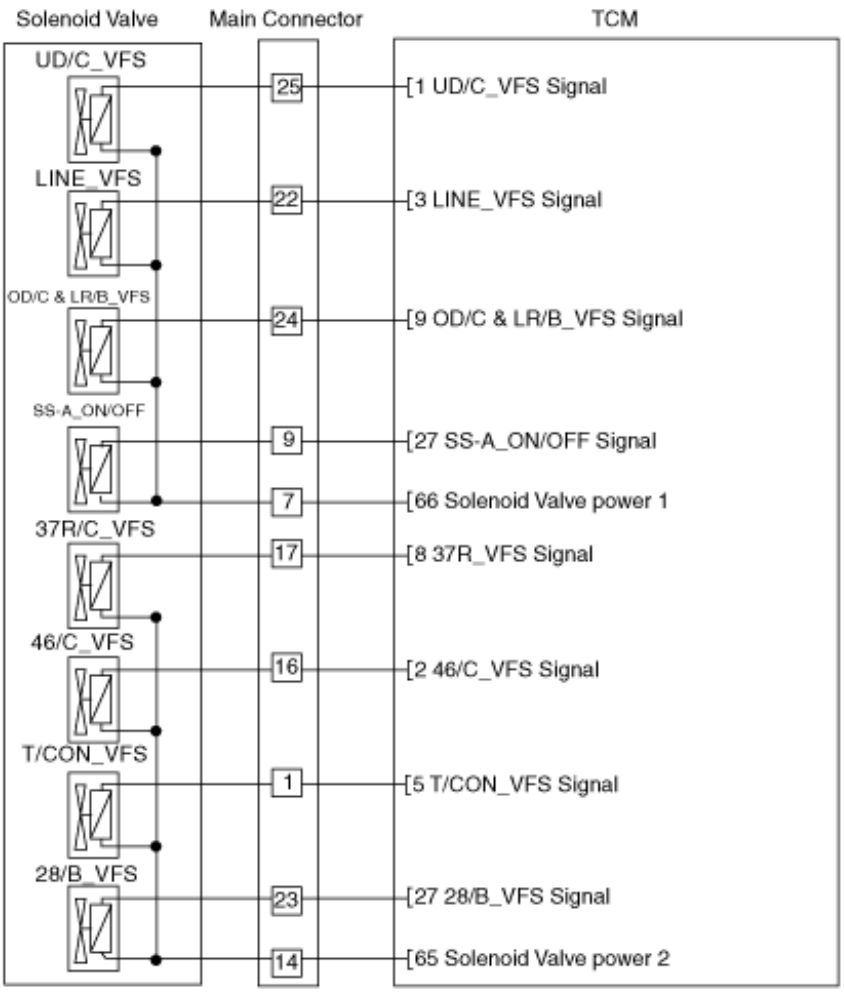
Item	Specification
Control pressure (kpa (kgf/cm, psi))	0 - 1,569.06 (0 - 16, 0 - 227.57)
Current (mA)	0 - 1,100
Internal resistance (Ω)	5.3 ± 0.3

▷ Operation of the solenoid valve

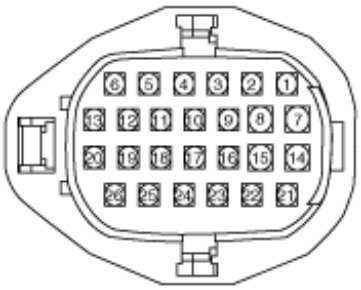
Division	Solenoid Valve	Clutch
	46/C_VFS	46/C
P		
R		
N		
1		
2		
3		
4	●	●
5		
6	●	●
7		
8		
Remark	● : Connected	●: Operation
	◎ : Variable connected	

- Circuit Diagram

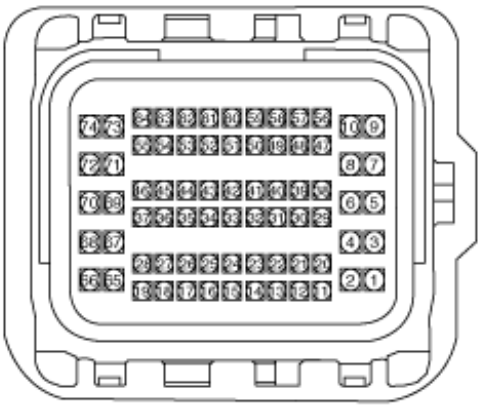
[Circuit Diagram]



[Connector]



[Main Connector]



[TCM Connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

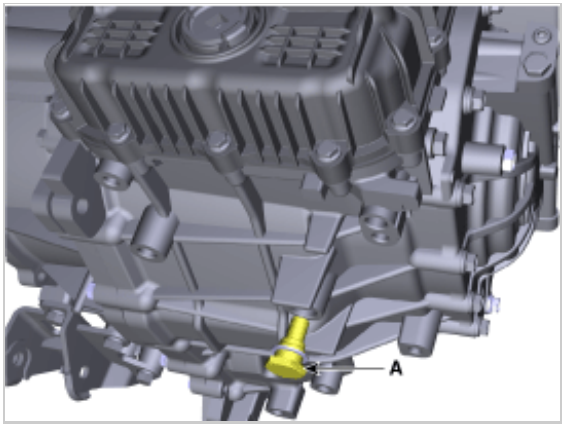
- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Cooling System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

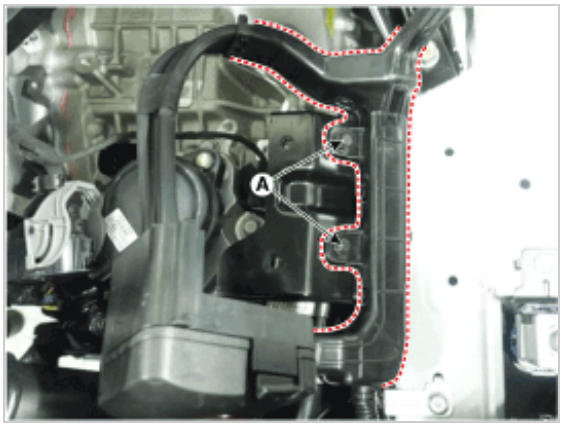
7. Loosen the bolts (A) and then removing the wiring bracket.

   Tightening torque :
   9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

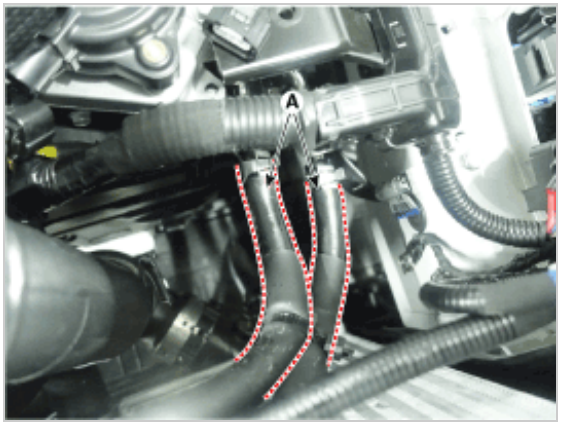
8. Loosen the bolts (A) and then removing the battery wiring bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Remove the ATF cooling hose (A).



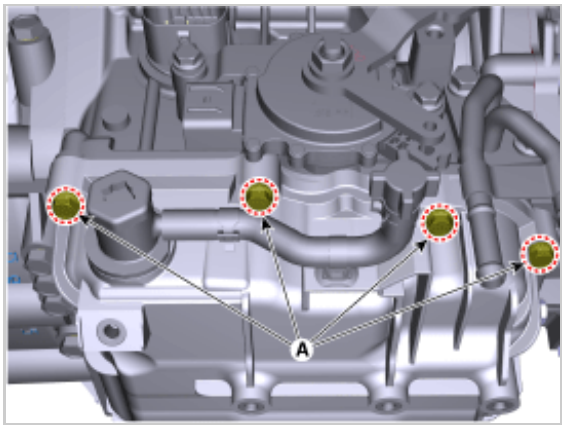
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



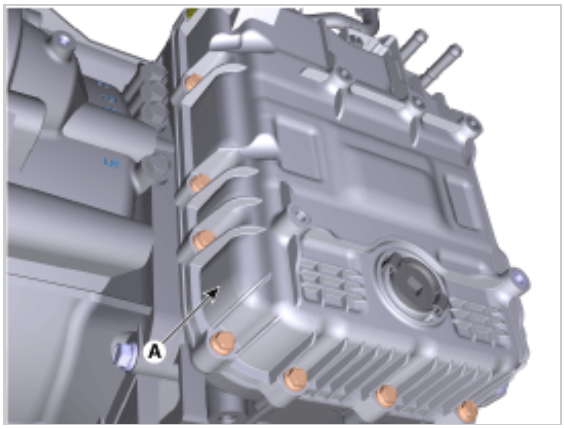
11. Loosen the bolts and then removing the valve body cover (A).

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

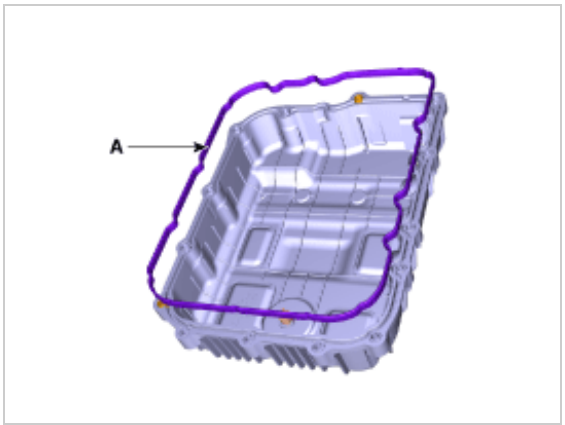
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

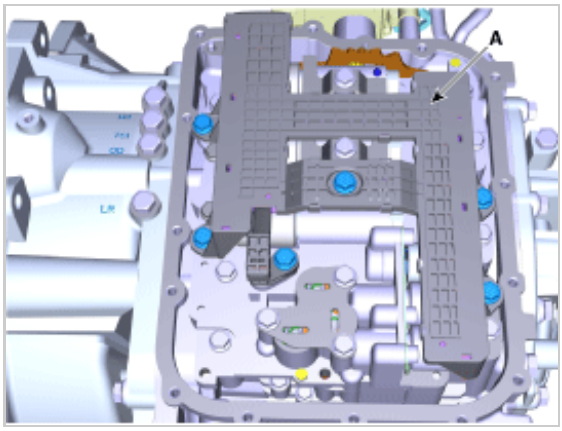
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then removing the main harness (A).

Tightening torque :

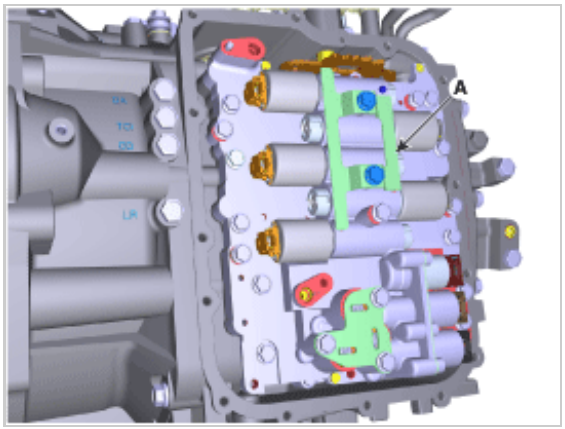
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



13. Remove the support bracket (A).

Tightening torque :

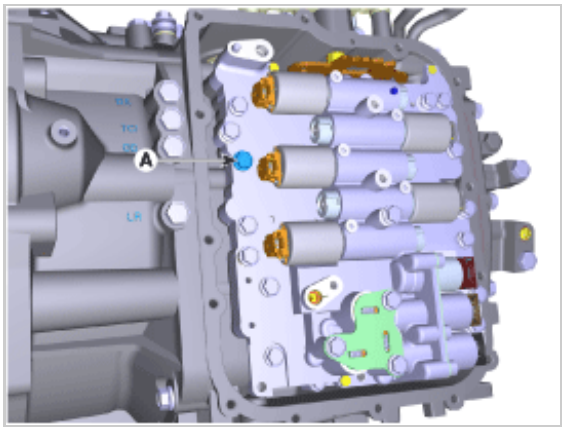
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



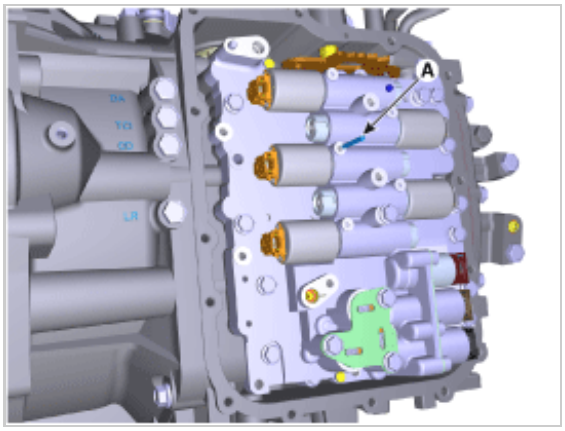
14. Loosen the bolt (A).

Tightening torque :

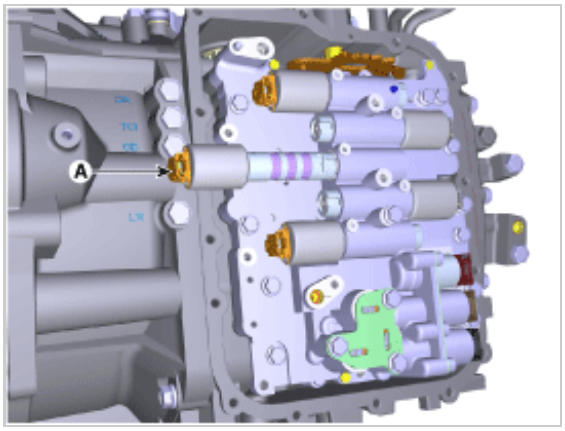
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



15. Remove the roller (A) using the magnet.



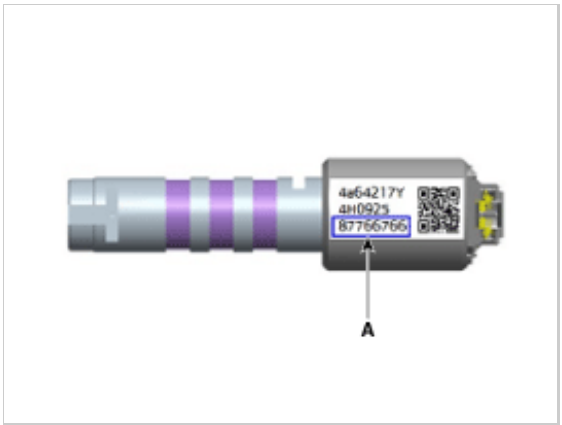
16. Remove the 46 Clutch control solenoid valve (A).



- Installation

⚠ CAUTION

- Note the value (A) carefully and check the value again before assembly.
- Inputting an invalid value may cause the abnormal shifting shock while TCM learning.



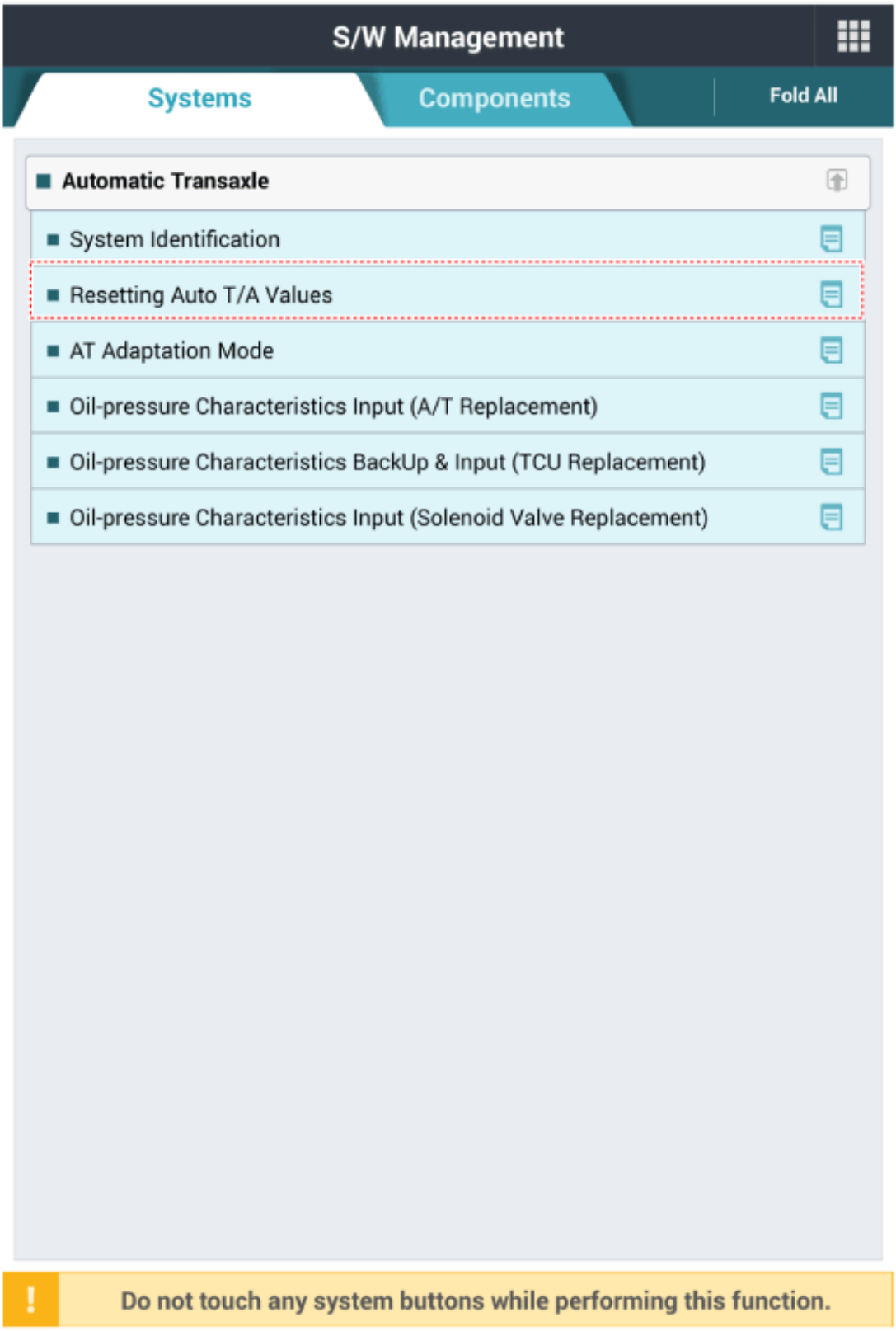
1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")
3. Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

⚠ CAUTION

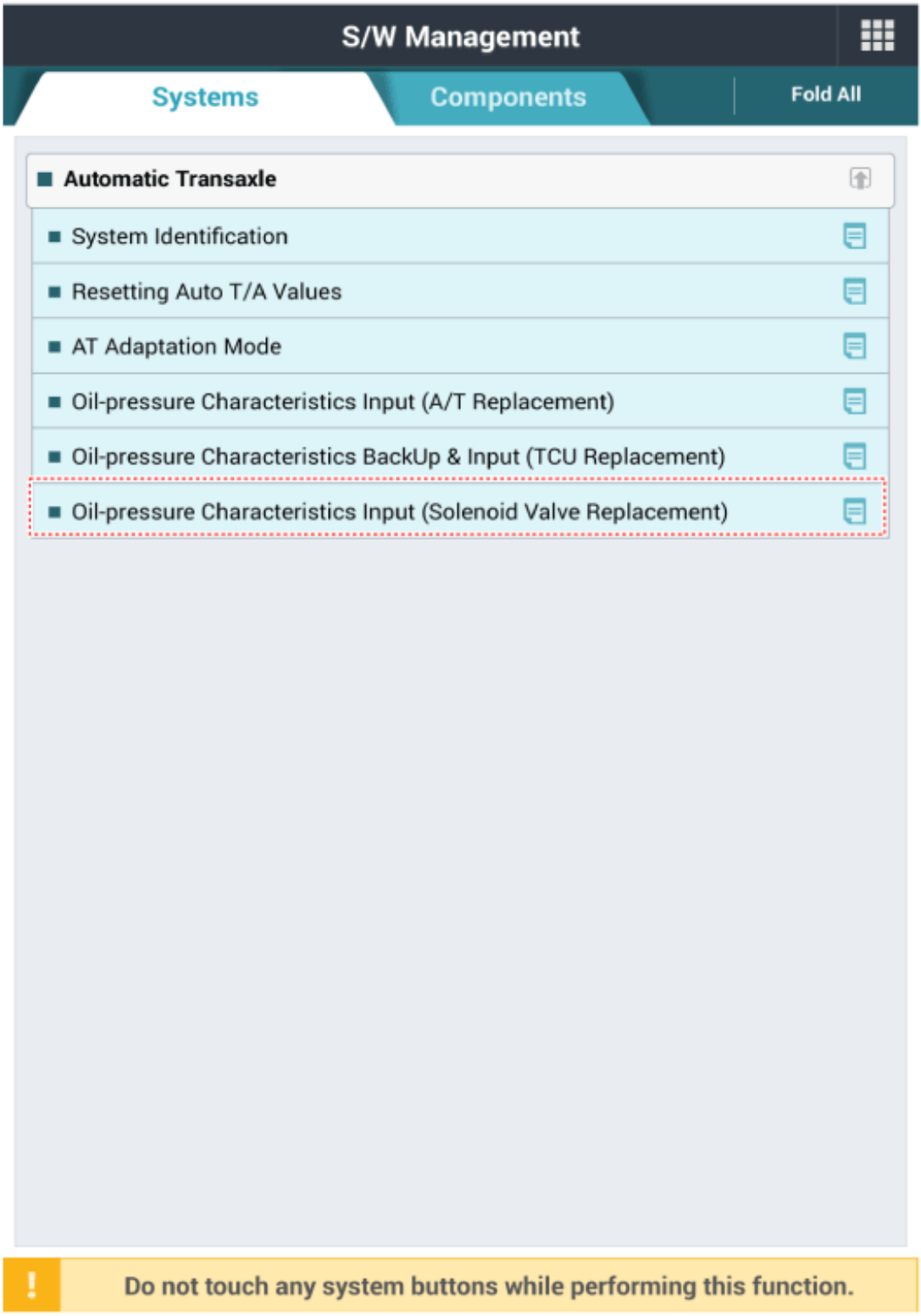
-

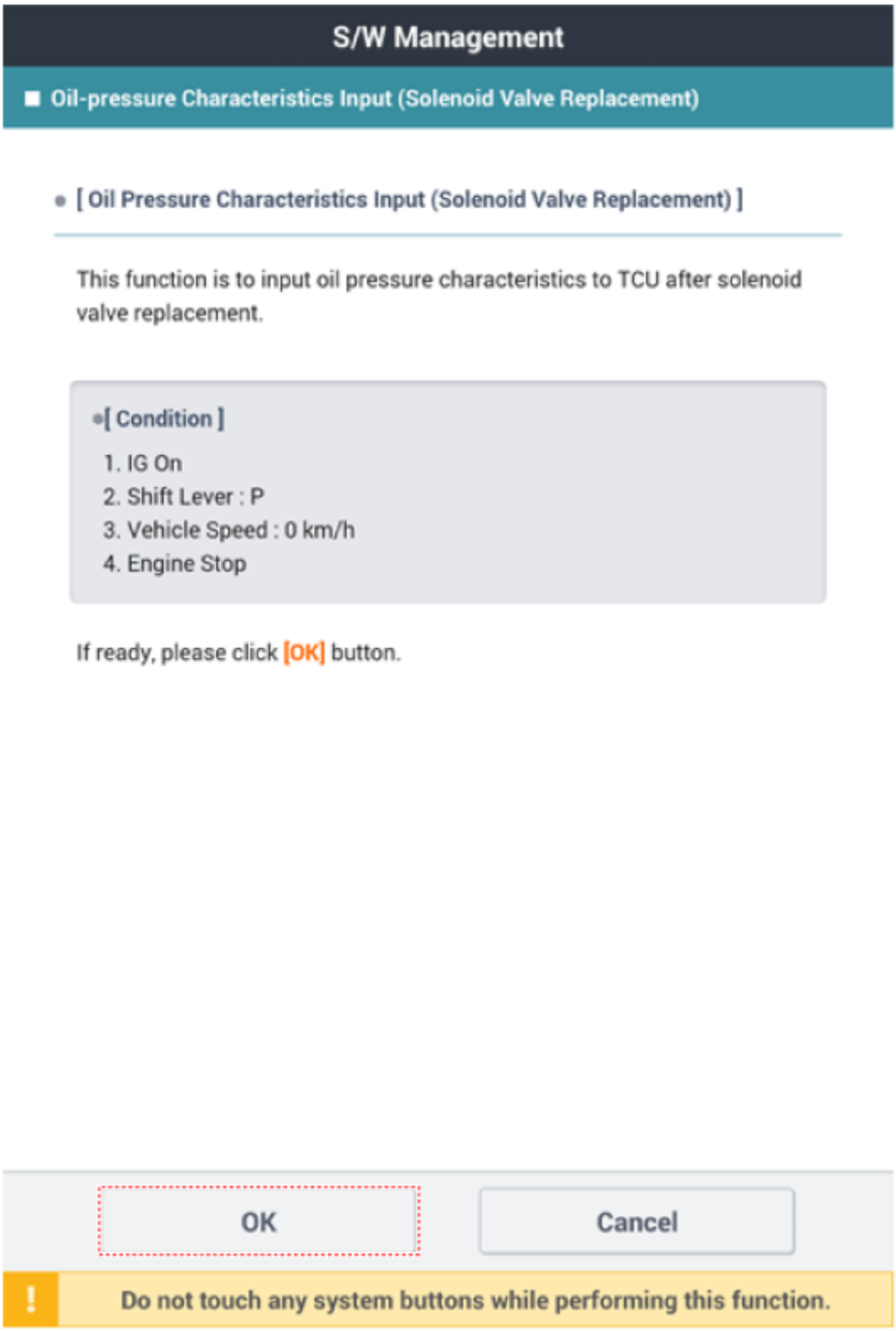
Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

4. Reset the automatic transaxle adaptive values using the diagnostic tool.



5. Input the oil pressure characteristics using the diagnostic tool.

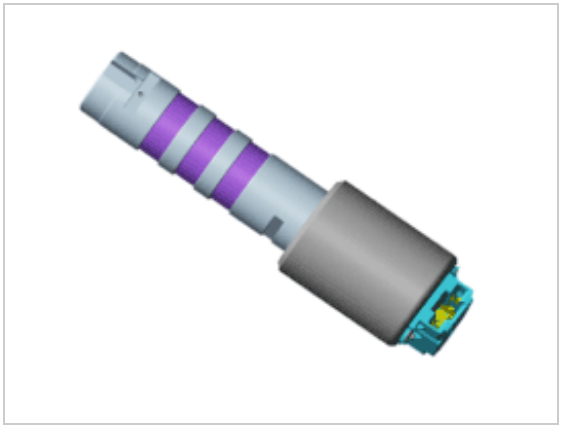

S/W Management
Systems
Components
Fold All
Automatic Transaxle
System Identification
Resetting Auto T/A Values
AT Adaptation Mode
Oil-pressure Characteristics Input (A/T Replacement)
Oil-pressure Characteristics BackUp & Input (TCU Replacement)
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
Do not touch any system buttons while performing this function.


S/W Management
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
[Oil Pressure Characteristics Input (Solenoid Valve Replacement)]
This function is to input oil pressure characteristics to TCU after solenoid valve replacement.
[Condition]
1. IG On
2. Shift Lever : P
3. Vehicle Speed : 0 km/h
4. Engine Stop
If ready, please click [OK] button.
OK
Cancel
Do not touch any system buttons while performing this function.

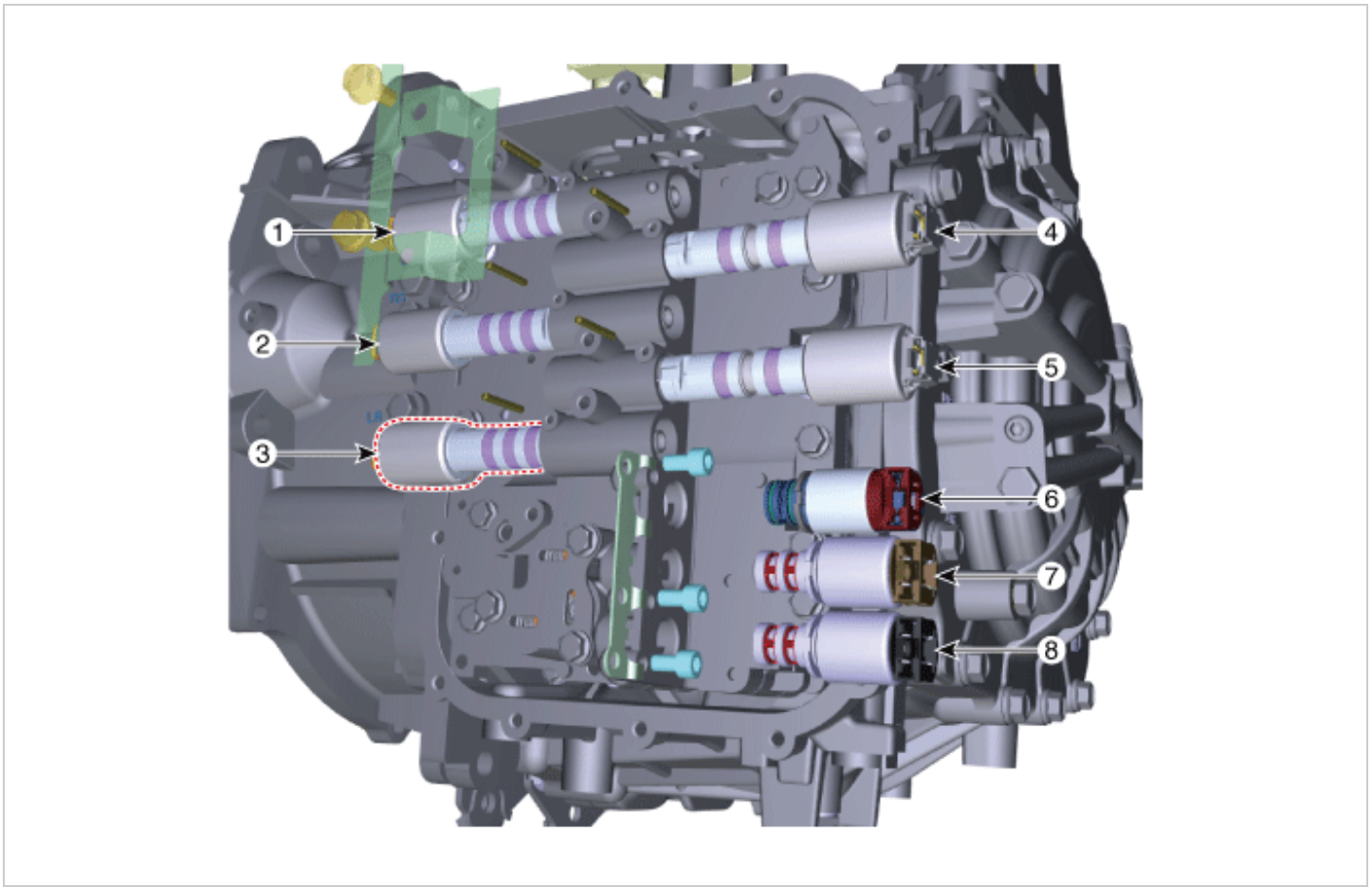
6. In order to prevent start delay and gear shift shock during acceleration and start, perform TCM learning after replacing the solenoid valve. (Refer to Automatic Transaxle Control System - "Repair Procedures")

- Description

• When TCM supplies variable current to solenoid valve, hydraulic pressure of 37R clutch is controlled directly by solenoid valve.
• 37R Clutch control solenoid valve is a Variable Force Solenoid (VFS) type.



- Components Location



1. 28 Brake control solenoid valve (28/B_VFS)
2. 46 Clutch control solenoid valve (46/C_VFS)
3. 37R Clutch control solenoid valve (37R/C_VFS)
4. UD Clutch control solenoid valve (UD/C_VFS)
5. OD Clutch & LR Brake control solenoid valve (OD/C & LR/B_VFS)
6. SS-A solenoid valve (SS-A_ON/OFF)
7. Torque converter control solenoid valve (T/CON_VFS)
8. Line pressure control solenoid valve (LINE_VFS)

- Specification

Clutch & Brake Control VFS

▷ Control type : Normally Low

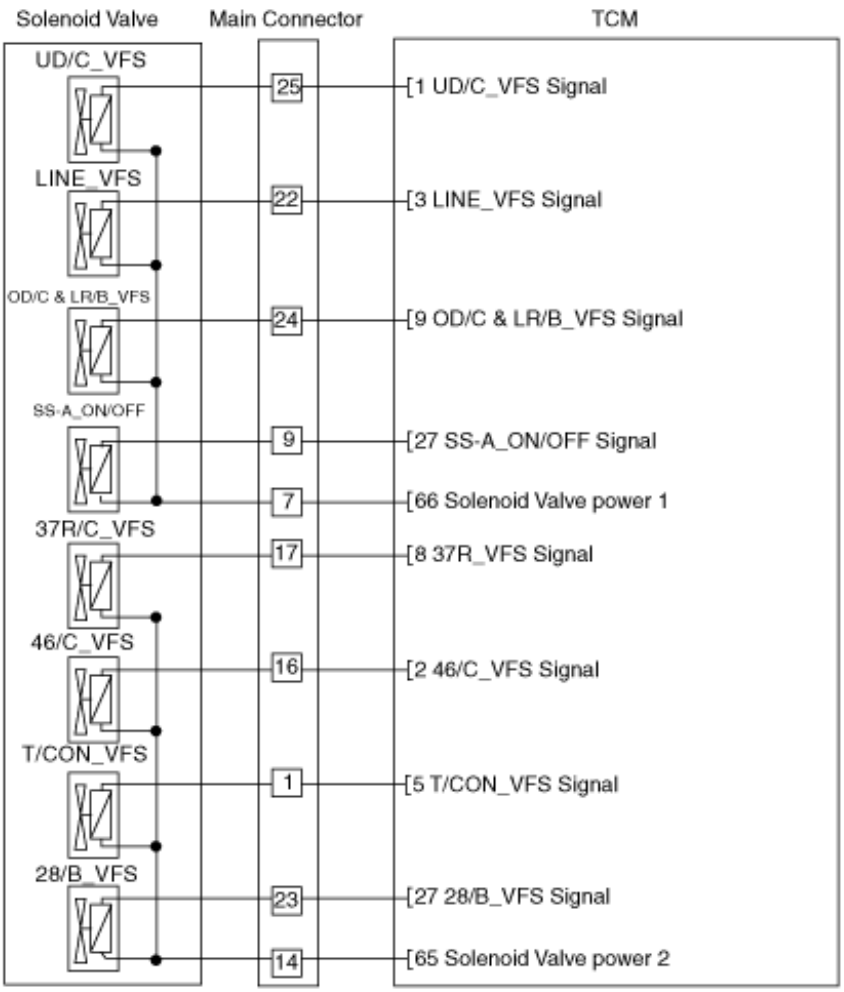
Item	Specification
Control pressure (kpa (kgf/cm, psi))	0 - 1,569.06 (0 - 16, 0 - 227.57)
Current (mA)	0 - 1,100
Internal resistance (Ω)	5.3 ± 0.3

▷ Operation of the solenoid valve

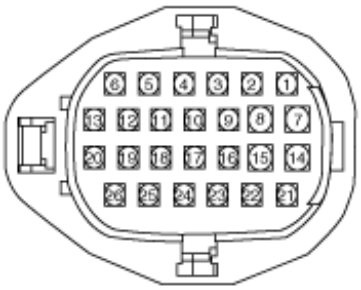
Division	Solenoid Valve	Clutch
	37R/C_VFS	37R/C
P		
R	●	●
N		
1		
2		
3	●	●
4		
5		
6		
7	●	●
8		
Remark	● : Connected	●: Operation
	◎ : Variable connected	

- Circuit Diagram

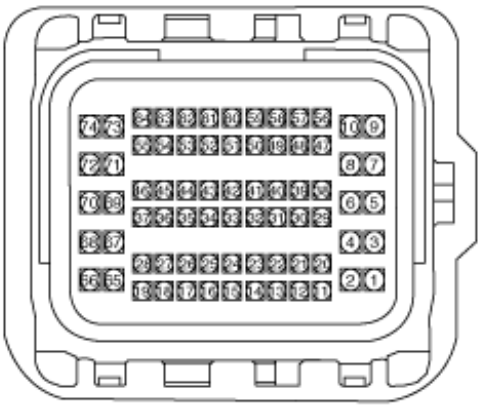
[Circuit Diagram]



[Connector]



[Main Connector]



[TCM Connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

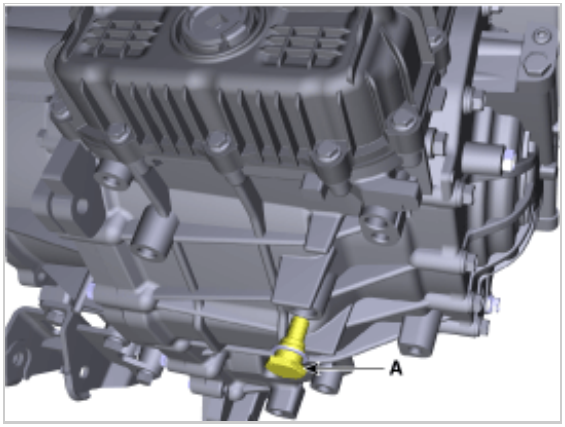
- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Cooling System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Drain plug tightening torque :
   33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

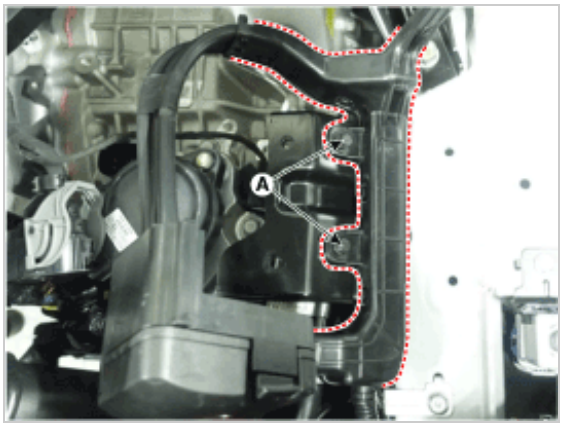
7. Loosen the bolts (A) and then removing the wiring bracket.

   Tightening torque :
   9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

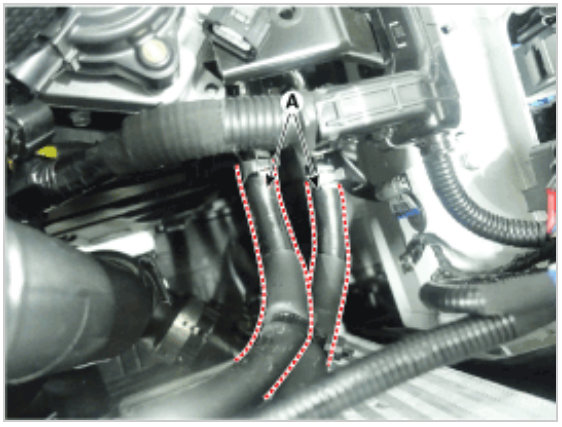
8. Loosen the bolts (A) and then removing the battery wiring bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Remove the ATF cooling hose (A).



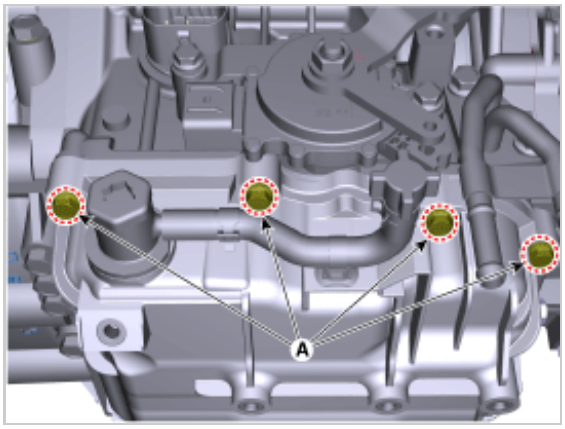
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Remove upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



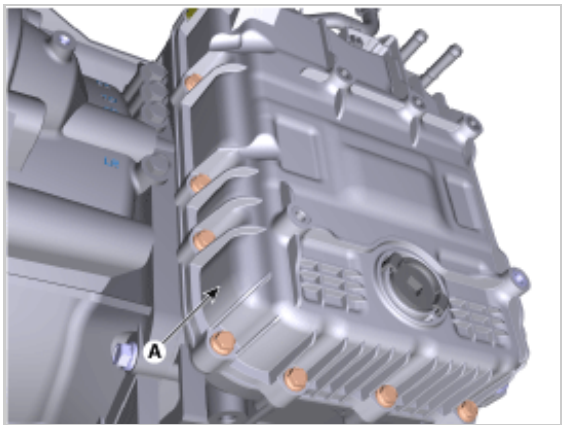
11. Loosen the bolts and then removing the valve body cover (A).

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

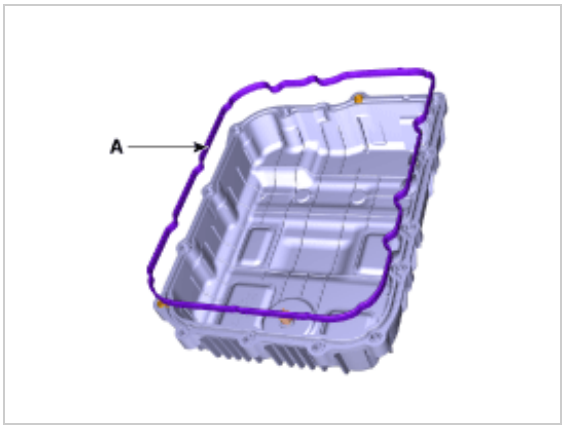
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

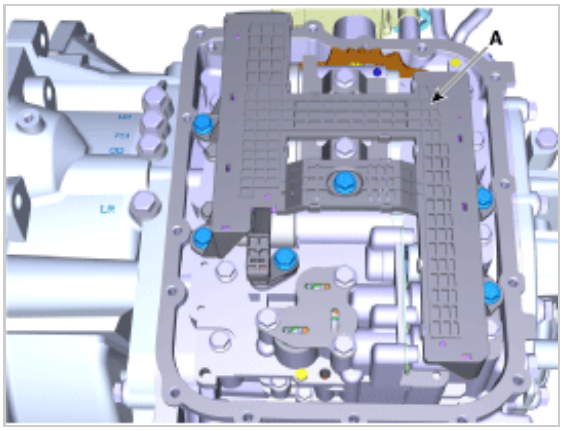
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then removing the main harness (A).

Tightening torque :

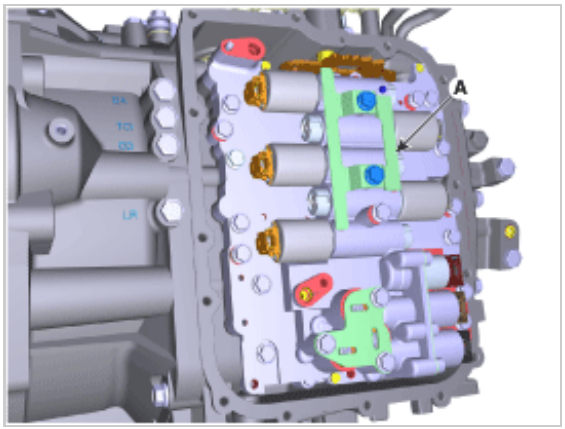
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



13. Remove the support bracket (A).

Tightening torque :

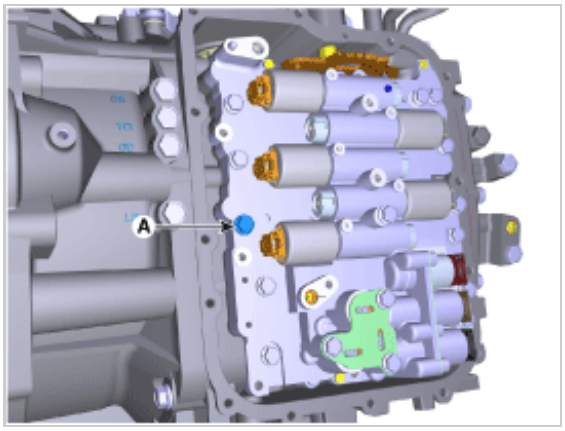
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



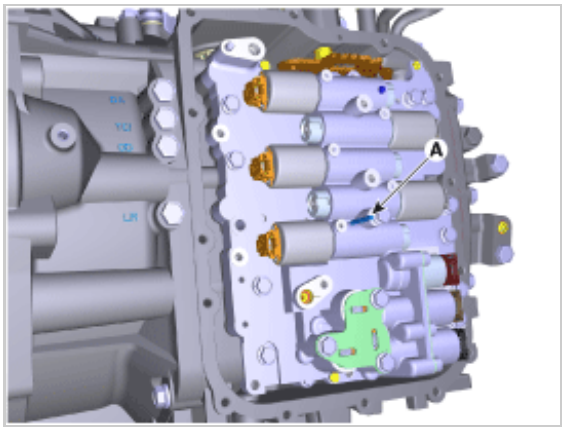
14. Remove the bolt (A).

Tightening torque :

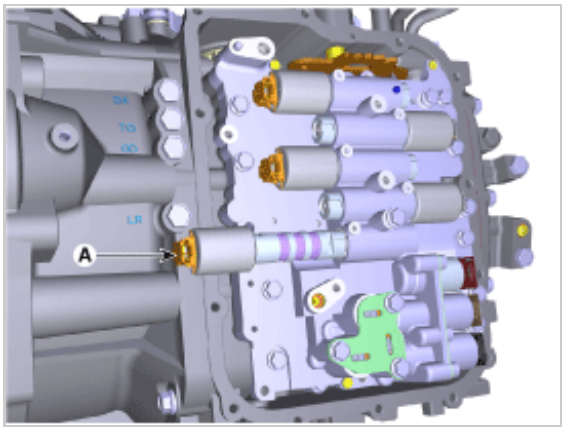
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



15. Remove the roller (A) using the magnet.



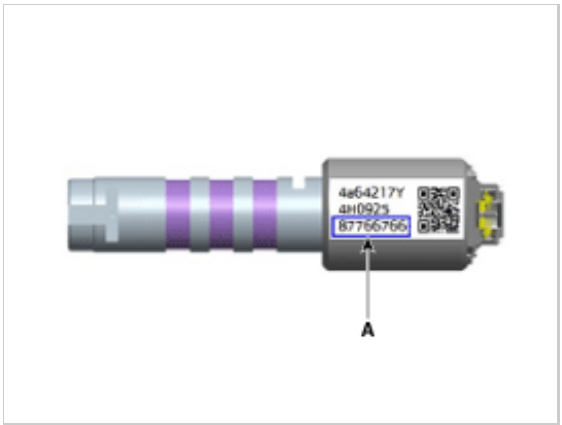
16. Remove the 37R Clutch control solenoid valve (A).



- Installation

⚠ CAUTION

- Note the value (A) carefully and check the value again before assembly.
- Inputting an invalid value may cause the abnormal shifting shock while TCM learning.



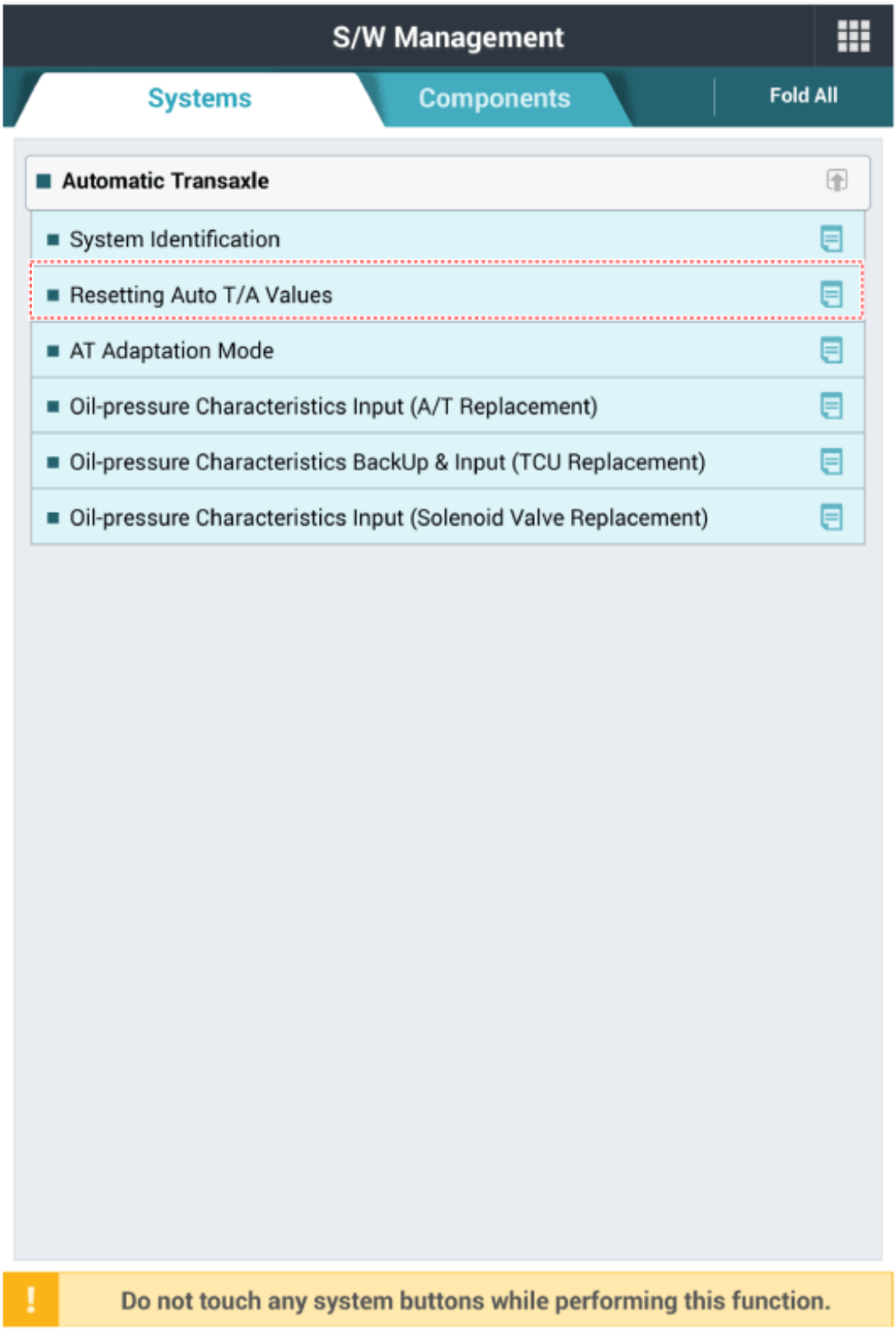
1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")
3. Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

⚠ CAUTION

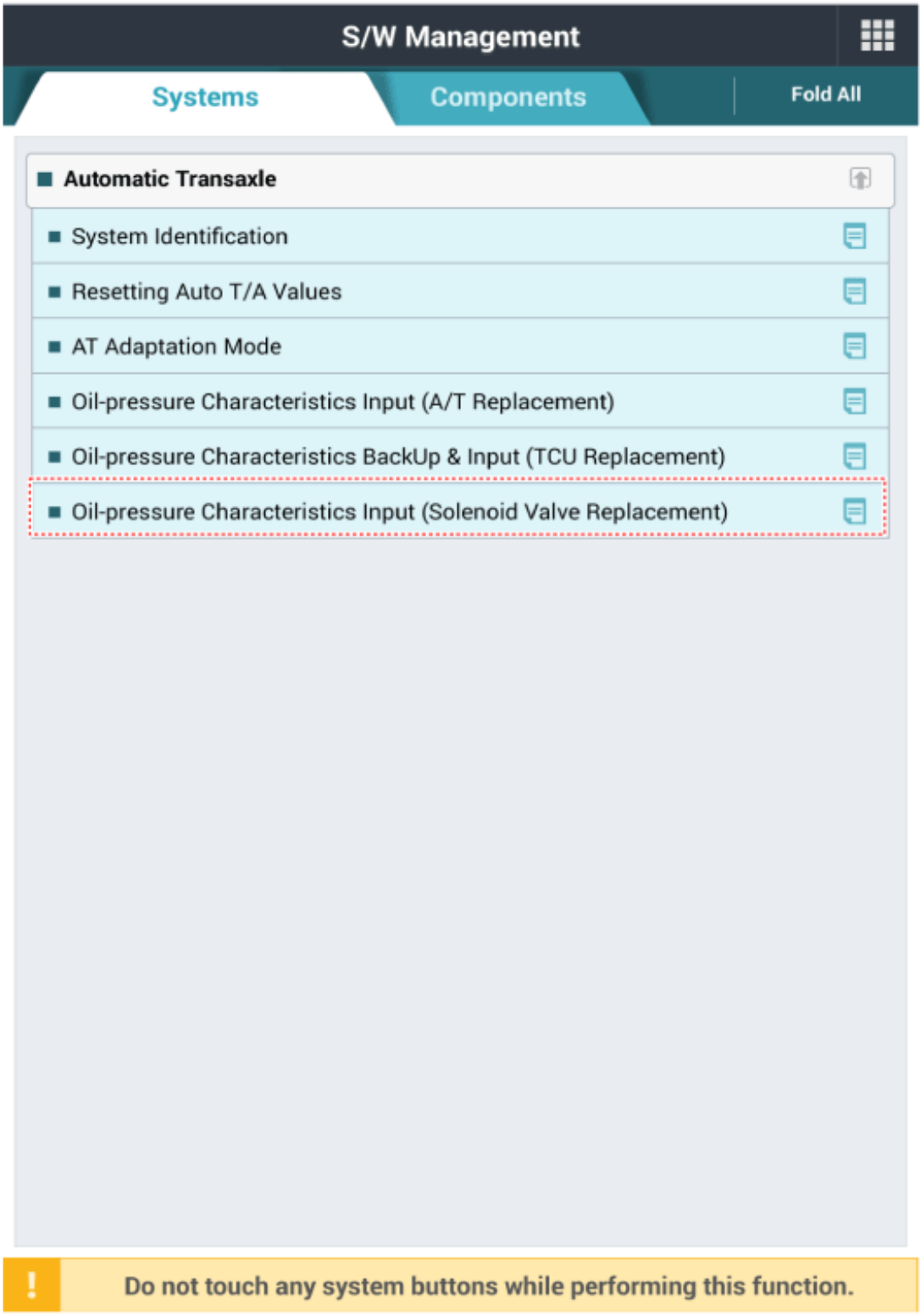
-

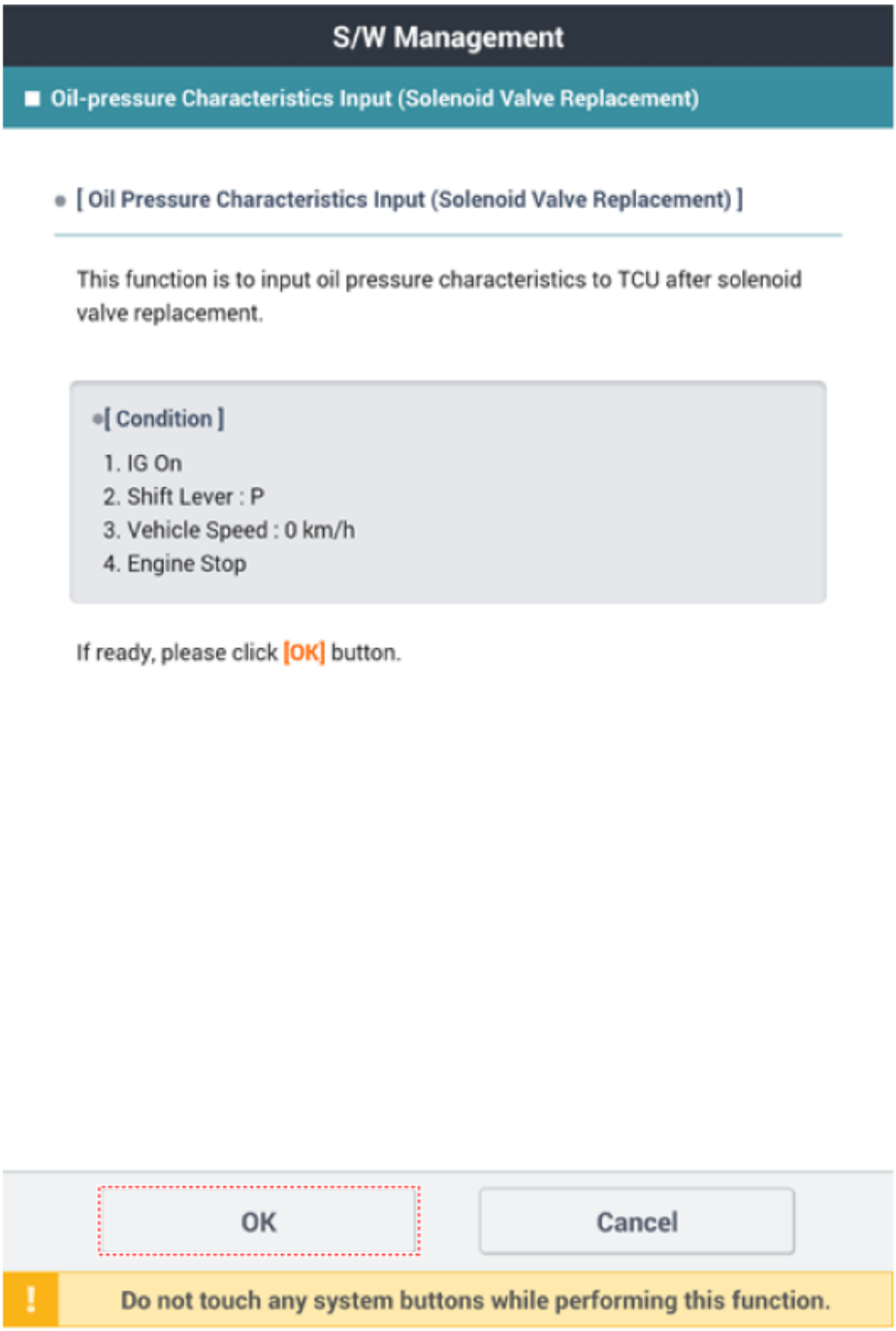
Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

4. Reset the automatic transaxle adaptive values using the diagnostic tool.



5. Input the oil pressure characteristics using the diagnostic tool.

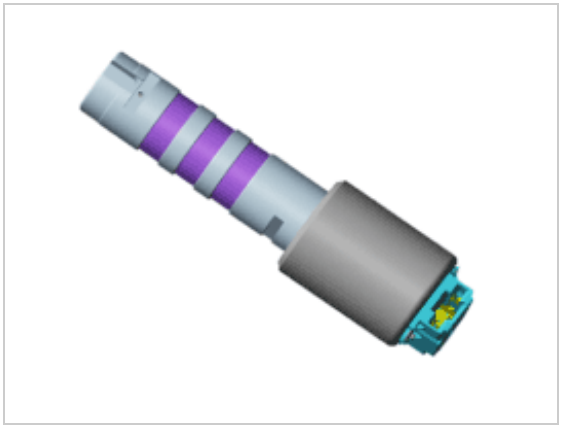

S/W Management
Systems
Components
Fold All
Automatic Transaxle
System Identification
Resetting Auto T/A Values
AT Adaptation Mode
Oil-pressure Characteristics Input (A/T Replacement)
Oil-pressure Characteristics BackUp & Input (TCU Replacement)
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
Do not touch any system buttons while performing this function.


S/W Management
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
[Oil Pressure Characteristics Input (Solenoid Valve Replacement)]
This function is to input oil pressure characteristics to TCU after solenoid valve replacement.
[Condition]
1. IG On
2. Shift Lever : P
3. Vehicle Speed : 0 km/h
4. Engine Stop
If ready, please click [OK] button.
OK
Cancel
Do not touch any system buttons while performing this function.

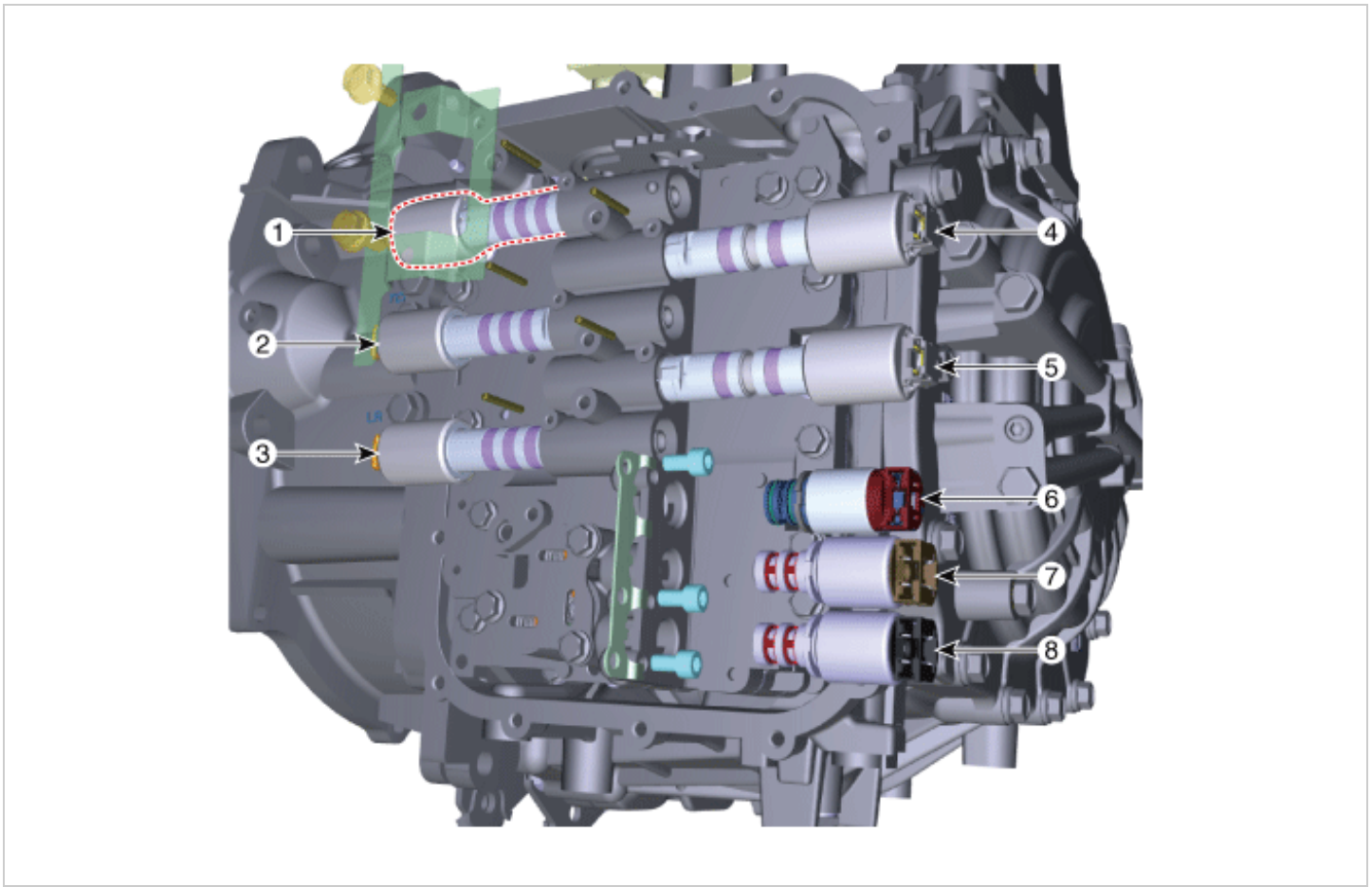
6. In order to prevent start delay and gear shift shock during acceleration and start, perform TCM learning after replacing the solenoid valve. (Refer to Automatic Transaxle Control System - "Repair Procedures")

- Description

• When TCM supplies variable current to solenoid valve, hydraulic pressure of 28 brake is controlled directly by solenoid valve.
• 28 Brake control solenoid valve is a Variable Force Solenoid (VFS) type.



- Components Location



1. 28 Brake control solenoid valve (28/B_VFS)
2. 46 Clutch control solenoid valve (46/C_VFS)
3. 37R Clutch control solenoid valve (37R/C_VFS)
4. UD Clutch control solenoid valve (UD/C_VFS)
5. OD Clutch & LR Brake control solenoid valve (OD/C & LR/B_VFS)
6. SS-A solenoid valve (SS-A_ON/OFF)
7. Torque converter control solenoid valve (T/CON_VFS)
8. Line pressure control solenoid valve (LINE_VFS)

- Specification

Clutch & Brake Control VFS

▷ Control type : Normally Low

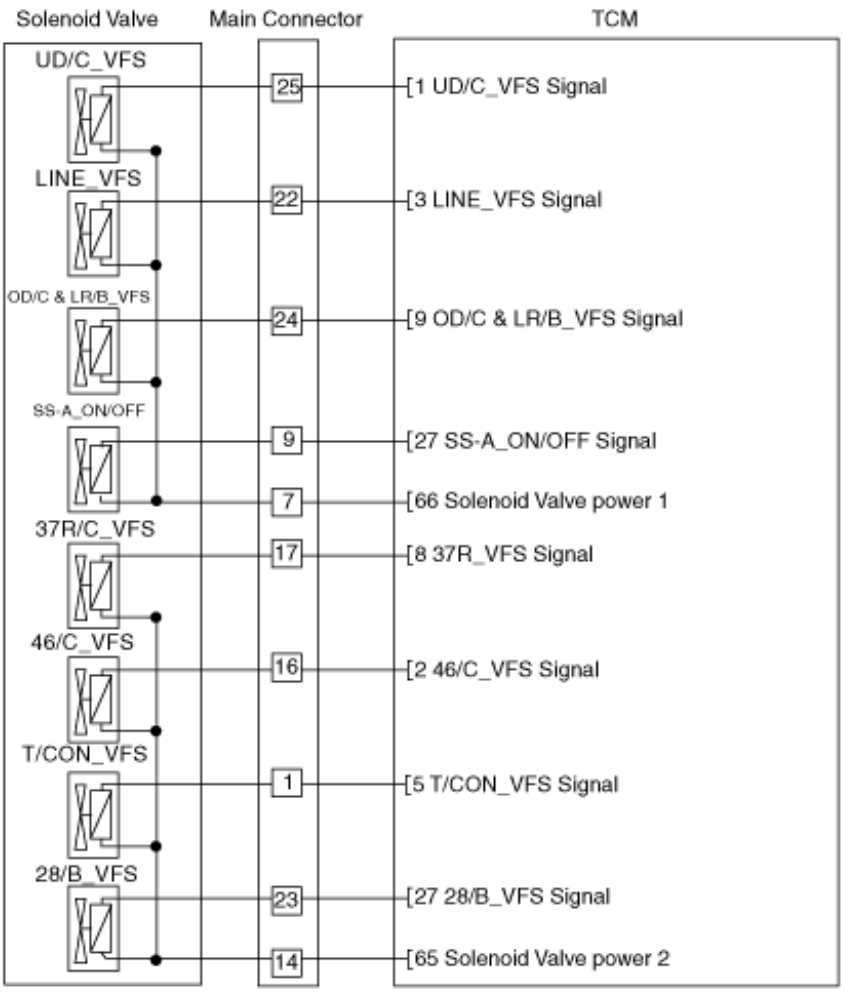
Item	Specification
Control pressure (kpa (kgf/cm, psi))	0 - 1,569.06 (0 - 16, 0 - 227.57)
Current (mA)	0 - 1,100
Internal resistance (Ω)	5.3 ± 0.3

▷ Operation of the solenoid valve

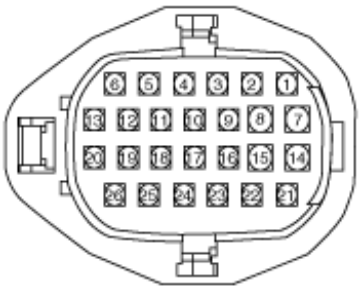
Division	Solenoid Valve	Clutch
	28/B_VFS	28/B
P		
R		
N		
1		
2	●	●
3		
4		
5		
6		
7		
8	●	●
Remark	● : Connected	●: Operation
	◎ : Variable connected	

- Circuit Diagram

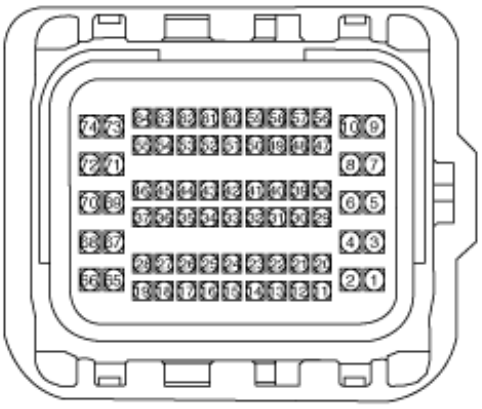
[Circuit Diagram]



[Connector]



[Main Connector]



[TCM Connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

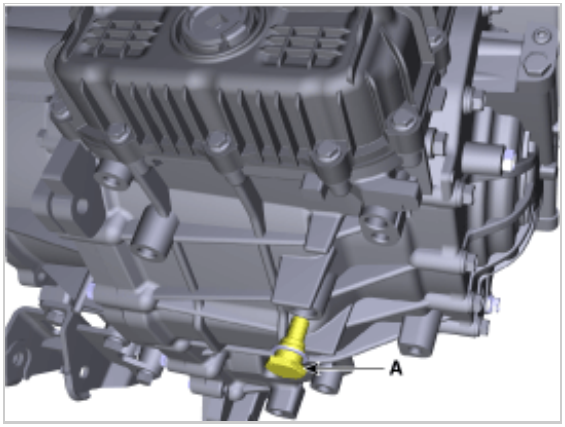
- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Cooling System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

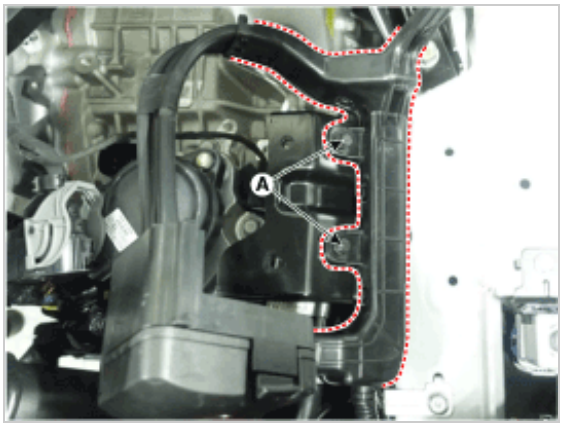
7. Loosen the bolts (A) and then removing the wiring bracket.

   Tightening torque :
   9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

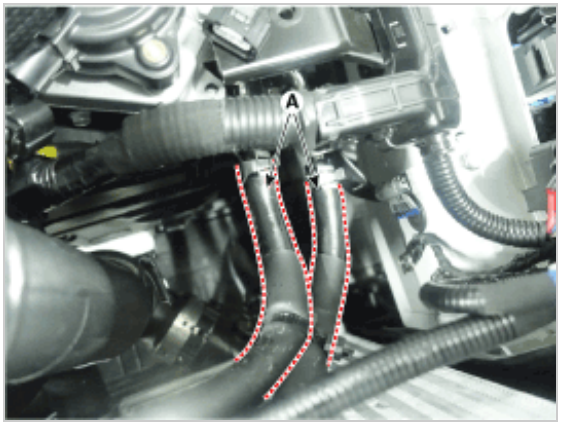
8. Loosen the bolts (A) and then removing the battery wiring bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Remove the ATF cooling hose (A).



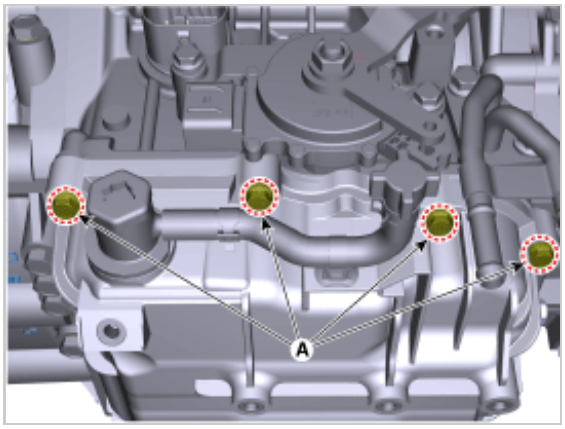
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



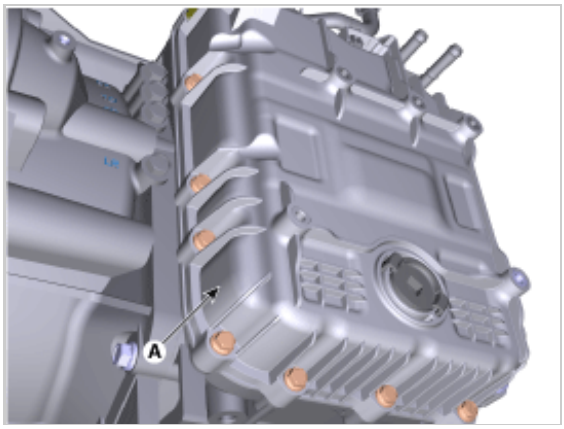
11. Loosen the bolts and then removing the valve body cover (A).

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

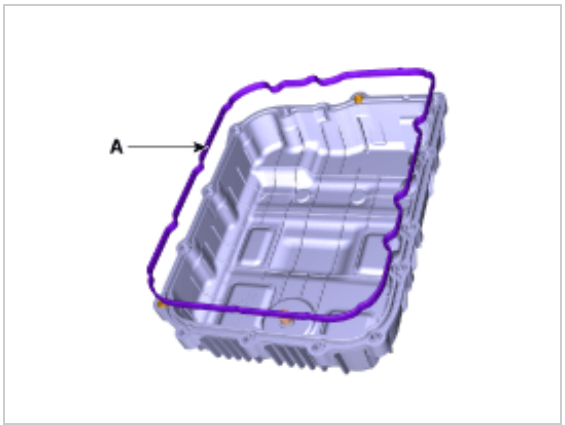
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

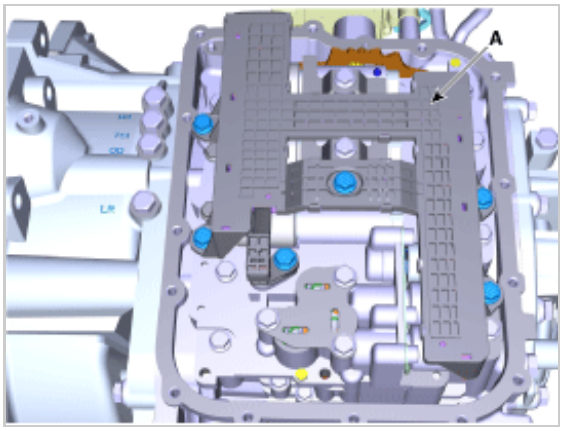
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then removing the main harness (A).

Tightening torque :

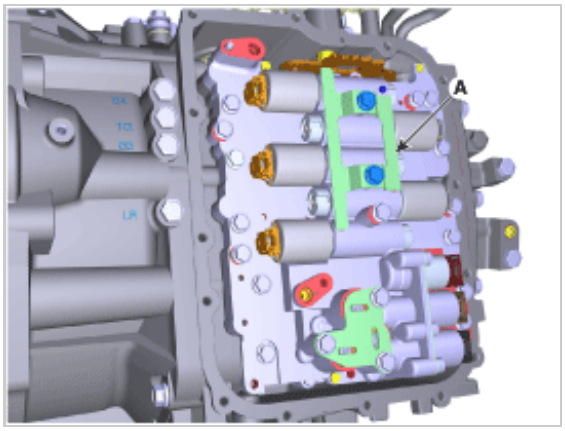
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



13. Remove the support bracket (A).

Tightening torque :

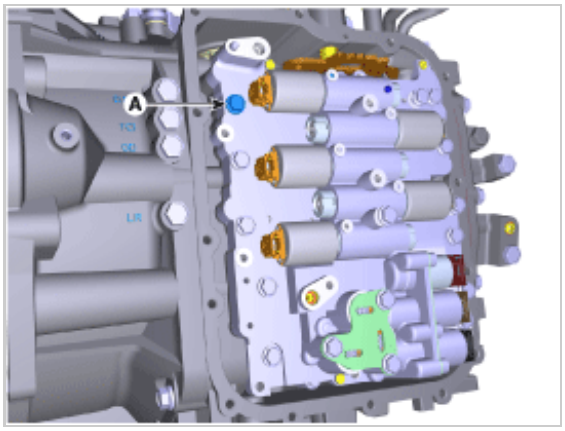
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



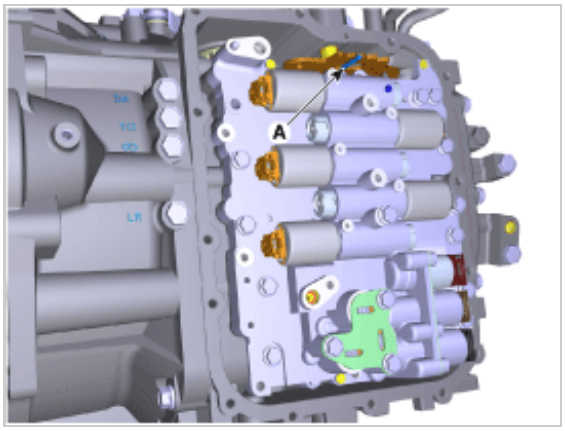
14. Loosen the bolt (A).

Tightening torque :

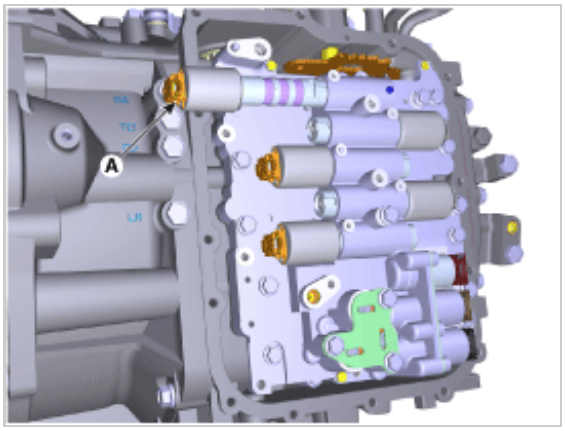
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



15. Remove the roller (A) using the magnet.



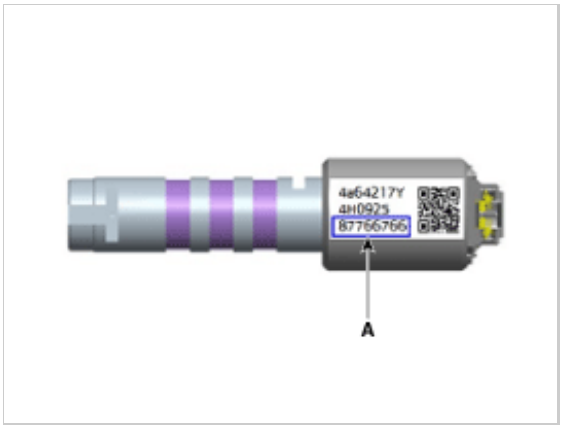
16. Remove the 28 Brake control solenoid valve (A).



- Installation

⚠ CAUTION

- Note the value (A) carefully and check the value again before assembly.
- Inputting an invalid value may cause the abnormal shifting shock while TCM learning.



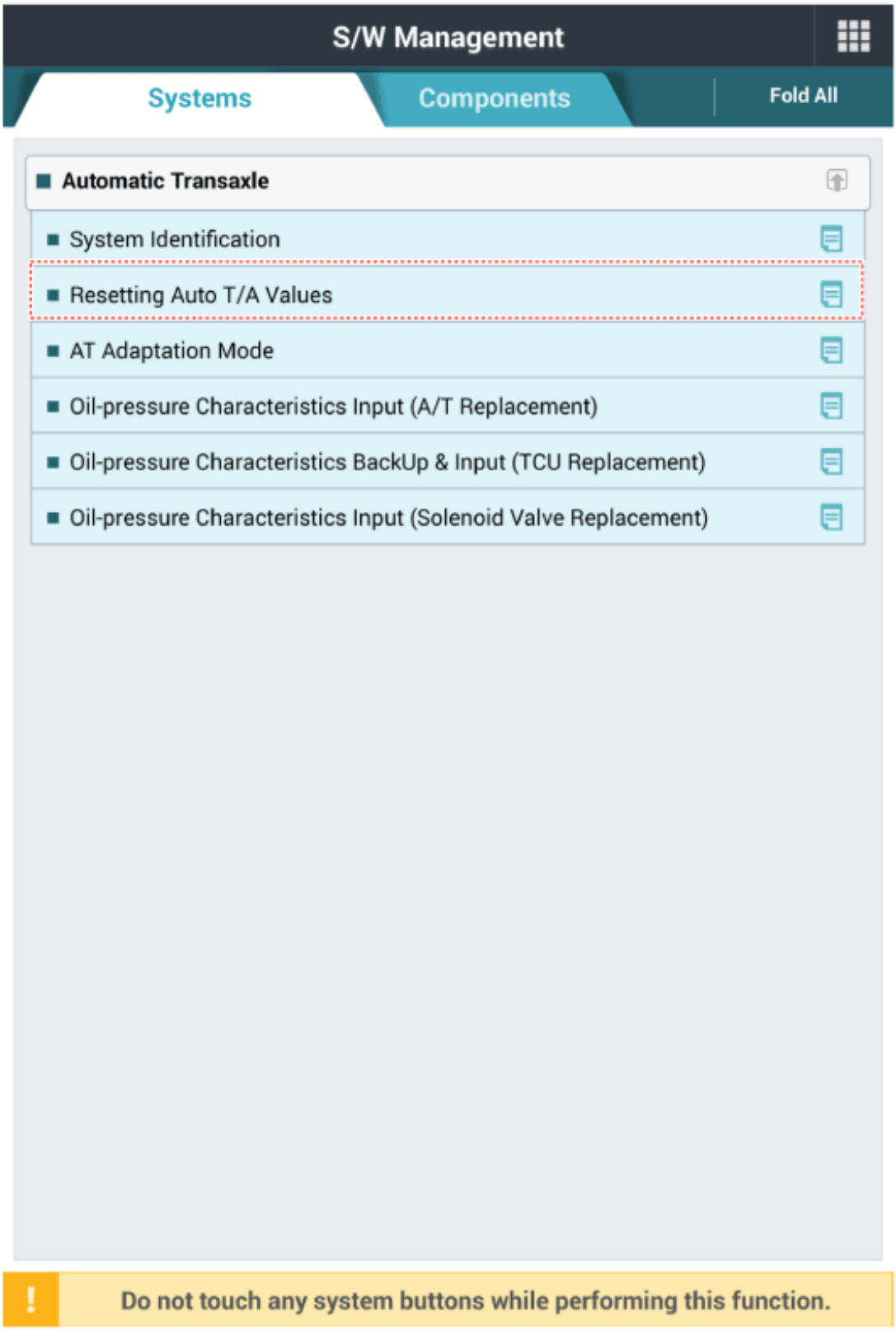
1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")
3. Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

⚠ CAUTION

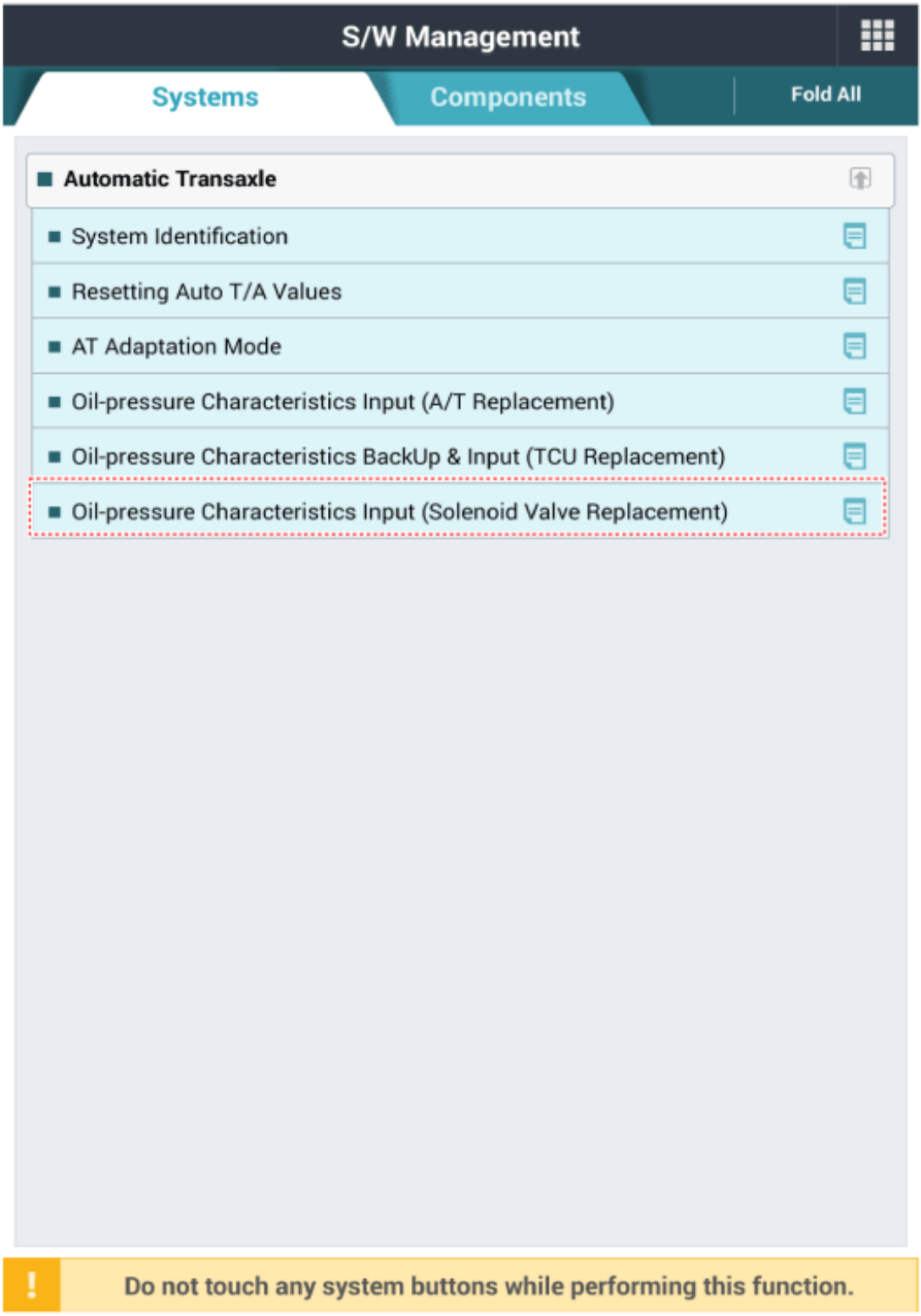
-

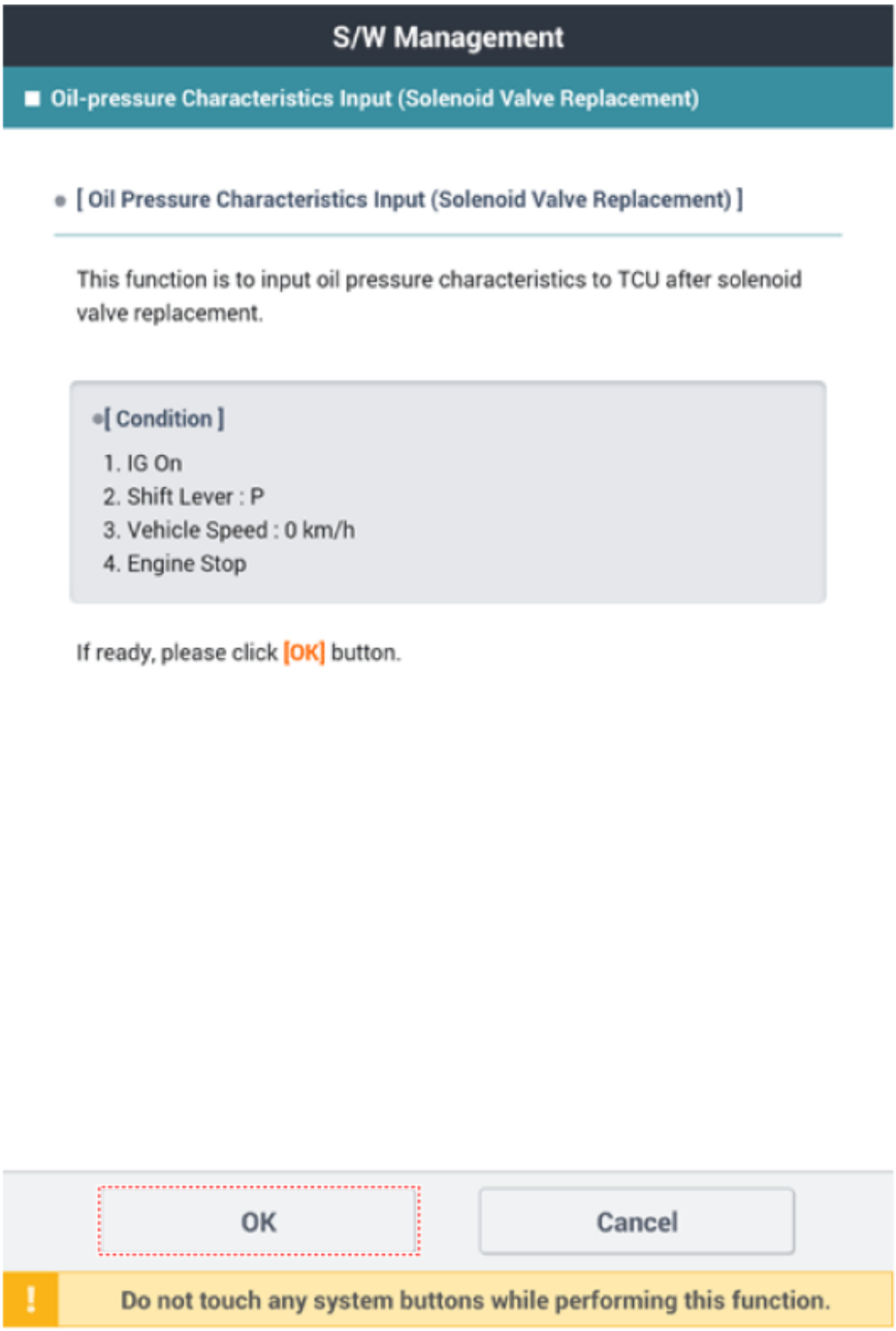
Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

4. Reset the automatic transaxle adaptive values using the diagnostic tool.



5. Input the oil pressure characteristics using the diagnostic tool.

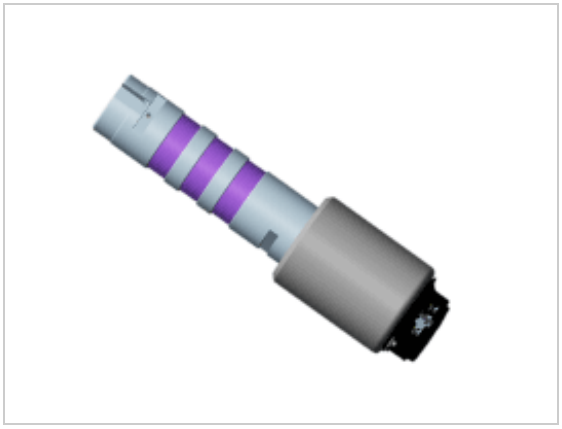

S/W Management
Systems
Components
Fold All
Automatic Transaxle
System Identification
Resetting Auto T/A Values
AT Adaptation Mode
Oil-pressure Characteristics Input (A/T Replacement)
Oil-pressure Characteristics BackUp & Input (TCU Replacement)
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
Do not touch any system buttons while performing this function.


S/W Management
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
[Oil Pressure Characteristics Input (Solenoid Valve Replacement)]
This function is to input oil pressure characteristics to TCU after solenoid valve replacement.
[Condition]
1. IG On
2. Shift Lever : P
3. Vehicle Speed : 0 km/h
4. Engine Stop
If ready, please click [OK] button.
OK
Cancel
Do not touch any system buttons while performing this function.

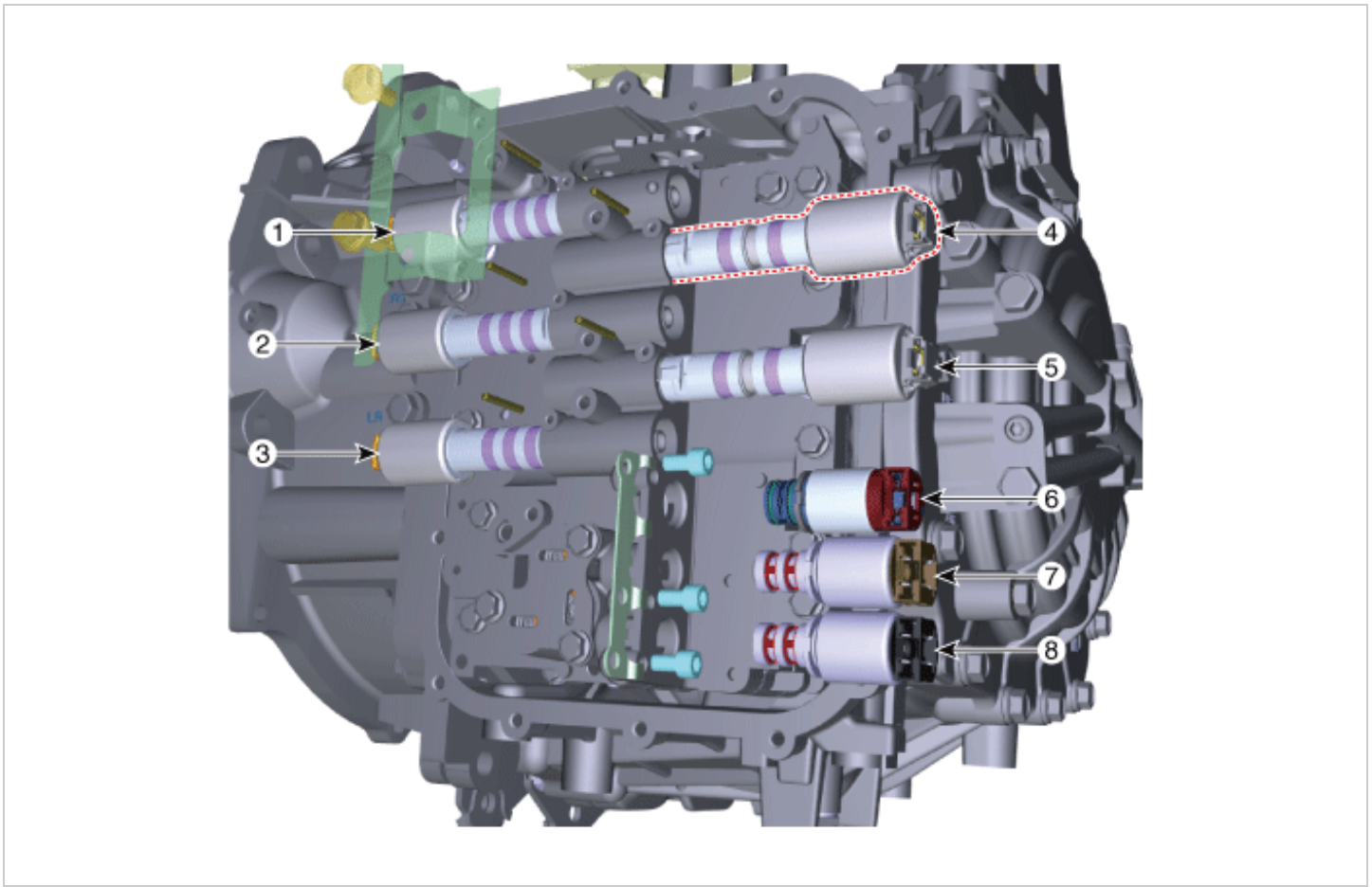
6. In order to prevent start delay and gear shift shock during acceleration and start, perform TCM learning after replacing the solenoid valve. (Refer to Automatic Transaxle Control System - "Repair Procedures")

- Description

• When TCM supplies variable current to solenoid valve, hydraulic pressure of UD clutch is controlled directly by solenoid valve.
• UD Clutch control solenoid valve is a Variable Force Solenoid (VFS) type.



- Components Location



1. 28 Brake control solenoid valve (28/B_VFS)
2. 46 Clutch control solenoid valve (46/C_VFS)
3. 37R Clutch control solenoid valve (37R/C_VFS)
4. UD Clutch control solenoid valve (UD/C_VFS)
5. OD Clutch & LR Brake control solenoid valve (OD/C & LR/B_VFS)
6. SS-A solenoid valve (SS-A_ON/OFF)
7. Torque converter control solenoid valve (T/CON_VFS)
8. Line pressure control solenoid valve (LINE_VFS)

- Specification

Clutch & Brake Control VFS

▷ Control type : Normally High

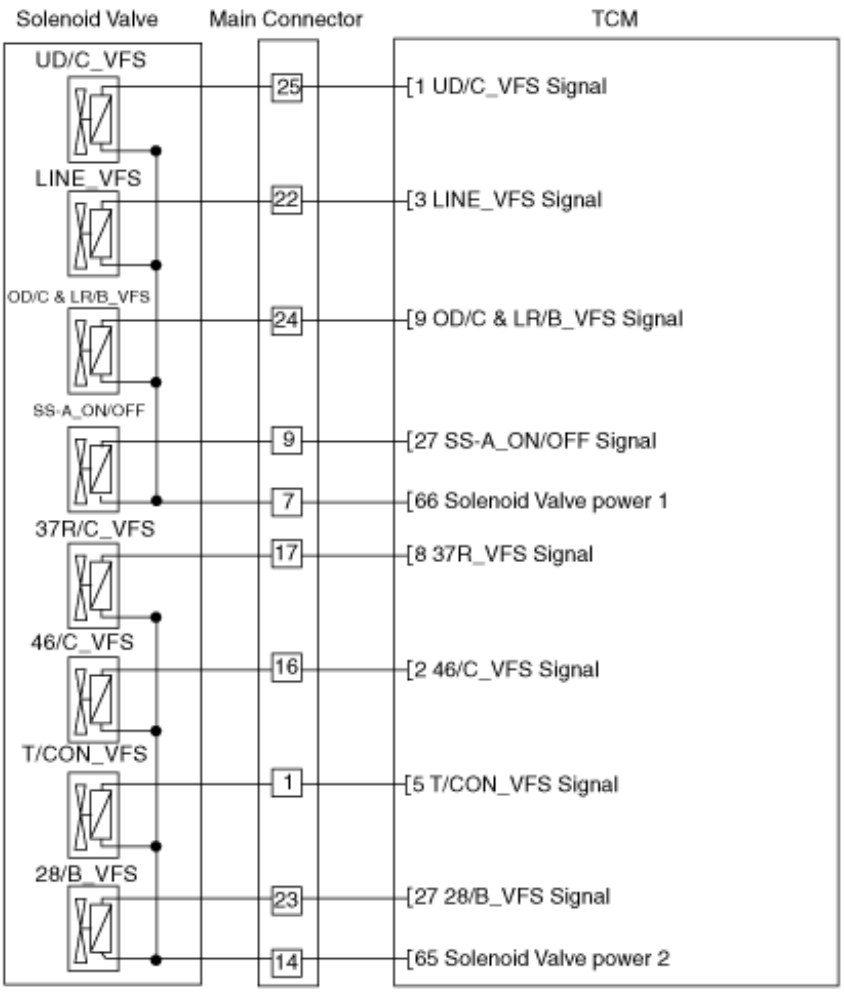
Item	Specification
Control pressure (kpa (kgf/cm, psi))	0 - 1,569.06 (0 - 16, 0 - 227.57)
Current (mA)	0 - 1,100
Internal resistance (Ω)	5.3 ± 0.3

▷ Operation of the solenoid valve

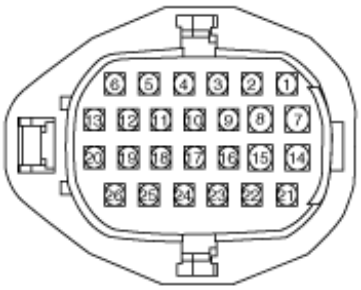
Division	Solenoid Valve	Clutch
	UD/C_VFS	UD/C
P	●	
R	●	
N	●	
1		●
2		●
3		●
4		●
5		●
6	●	
7	●	
8	●	
Remark	● : Connected	●: Operation
	◎ : Variable connected	

- Circuit Diagram

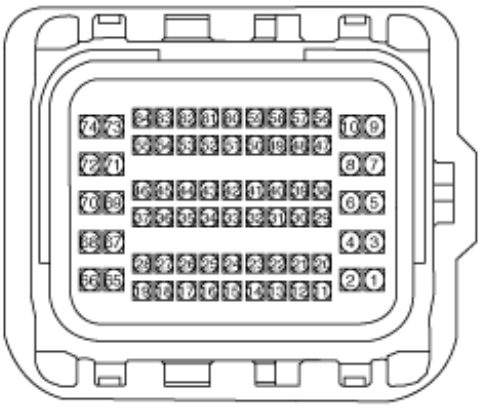
[Circuit Diagram]



[Connector]



[Main Connector]



[TCM Connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

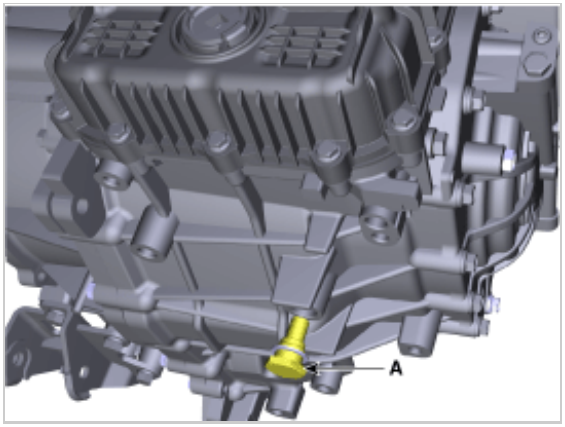
- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Cooling System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

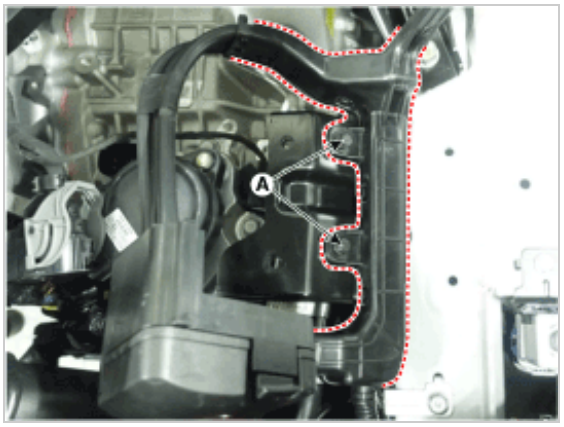
7. Loosen the bolts (A) and then removing the wiring bracket.

   Tightening torque :
   9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

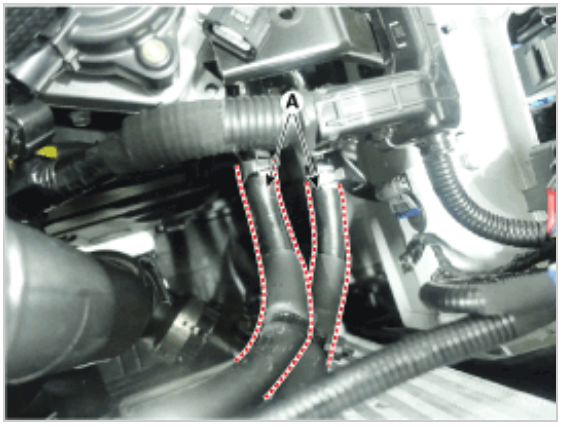
8. Loosen the bolts (A) and then removing the battery wiring bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Remove the ATF cooling hose (A).



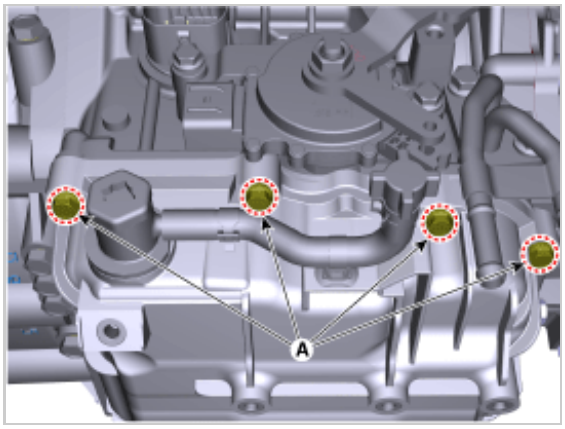
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



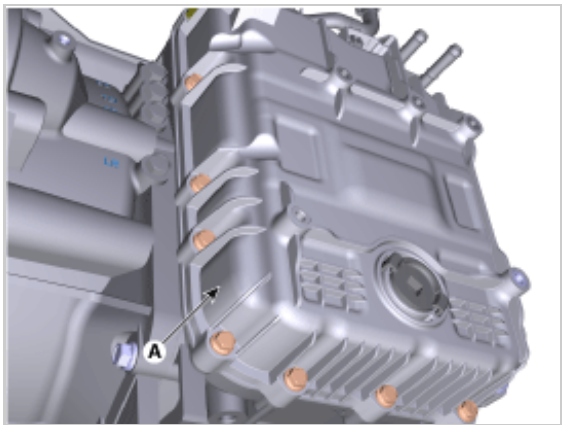
11. Loosen the bolts and then removing the valve body cover (A).

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

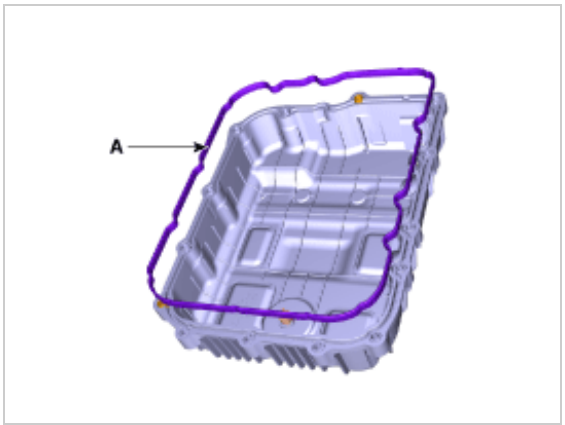
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

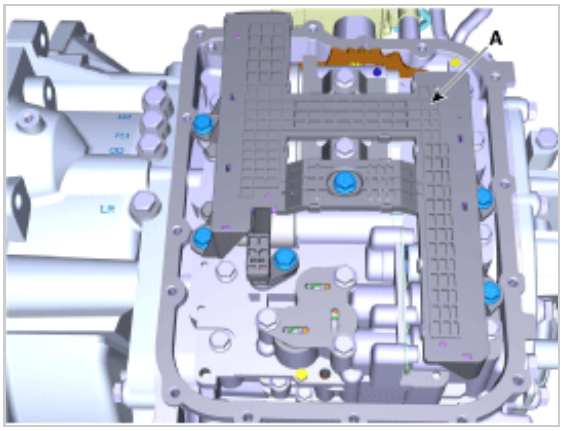
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then removing the main harness (A).

Tightening torque :

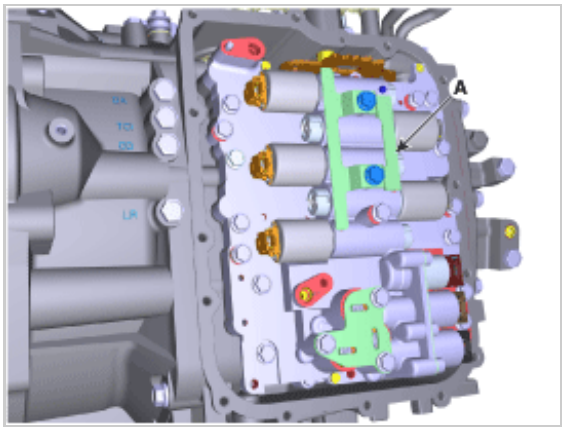
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



13. Remove the support bracket (A).

Tightening torque :

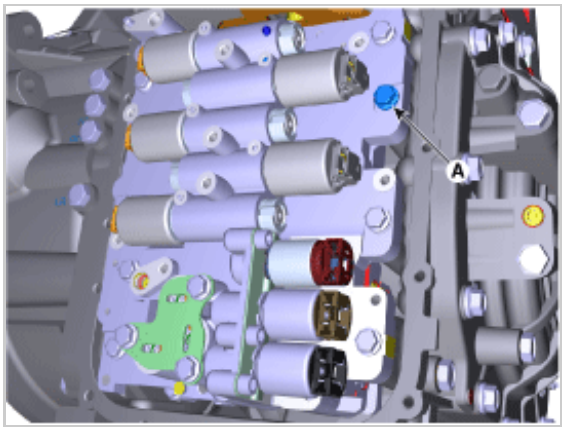
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



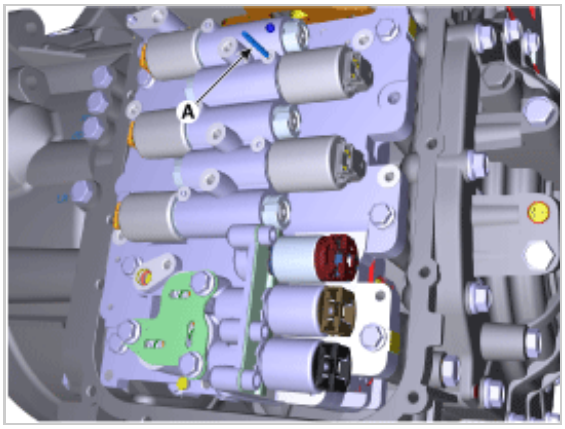
14. Loosen the bolt (A).

Tightening torque :

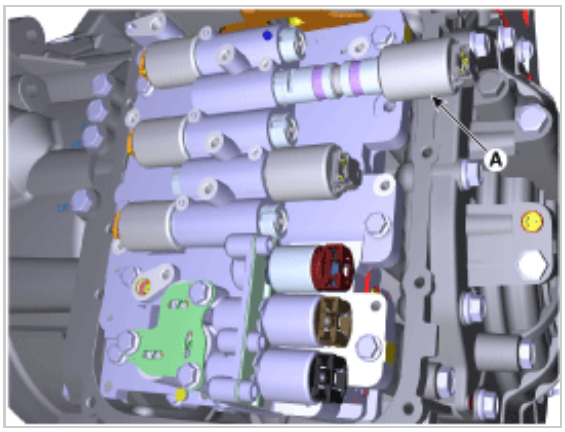
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



15. Remove the roller (A) using the magnet.



16. Remove the UD clutch control solenoid valve (A).

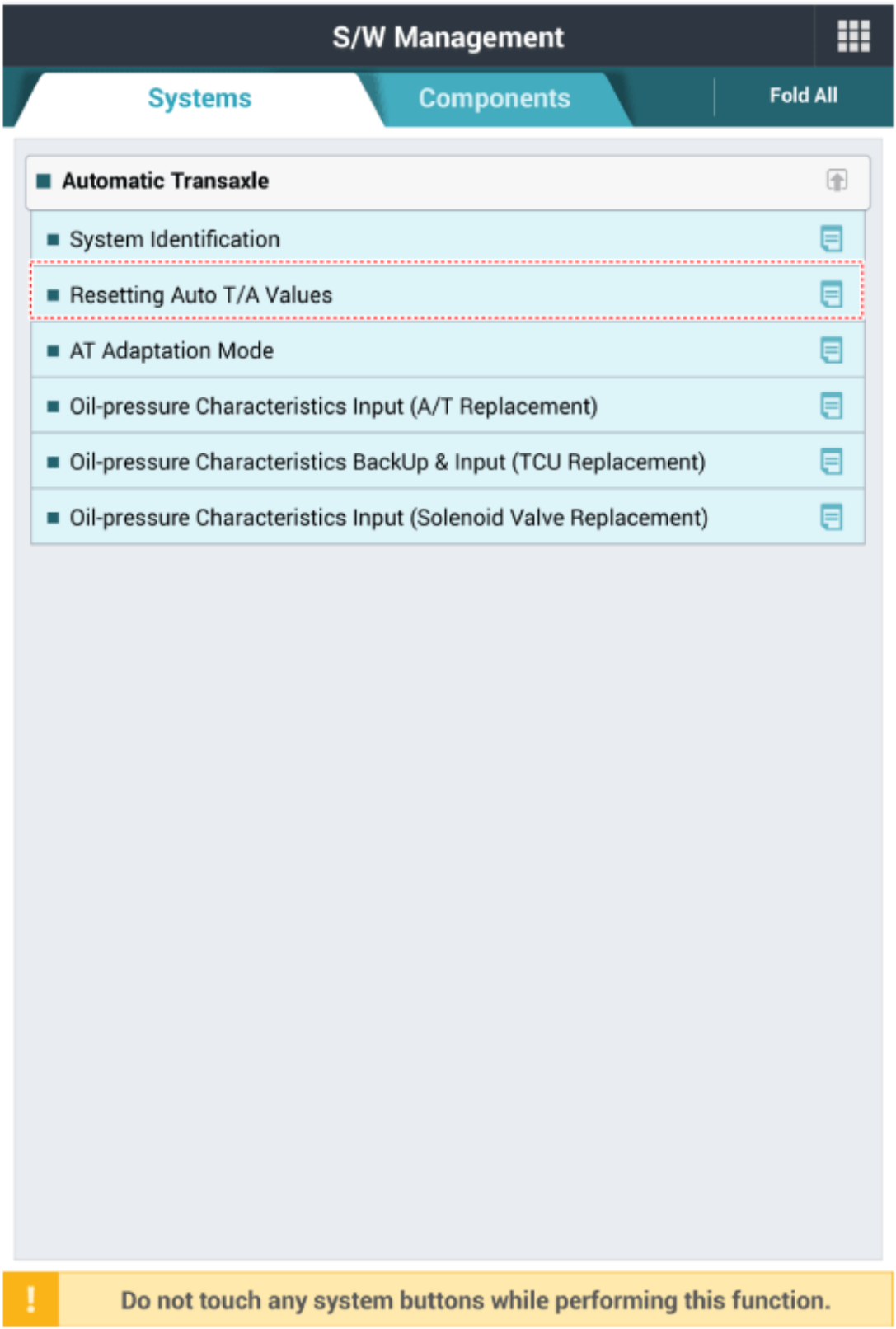


- Installation

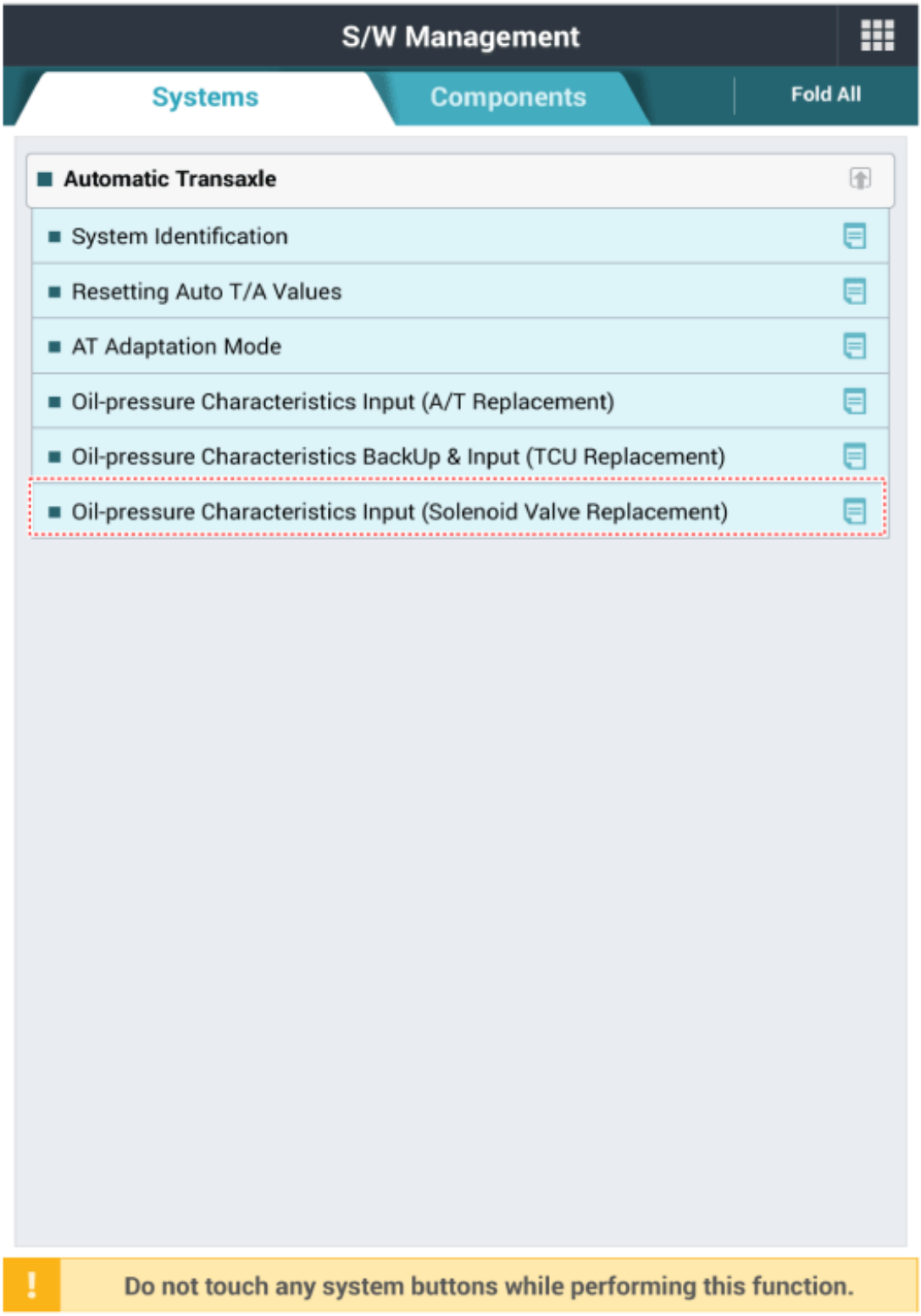
1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")
3. Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

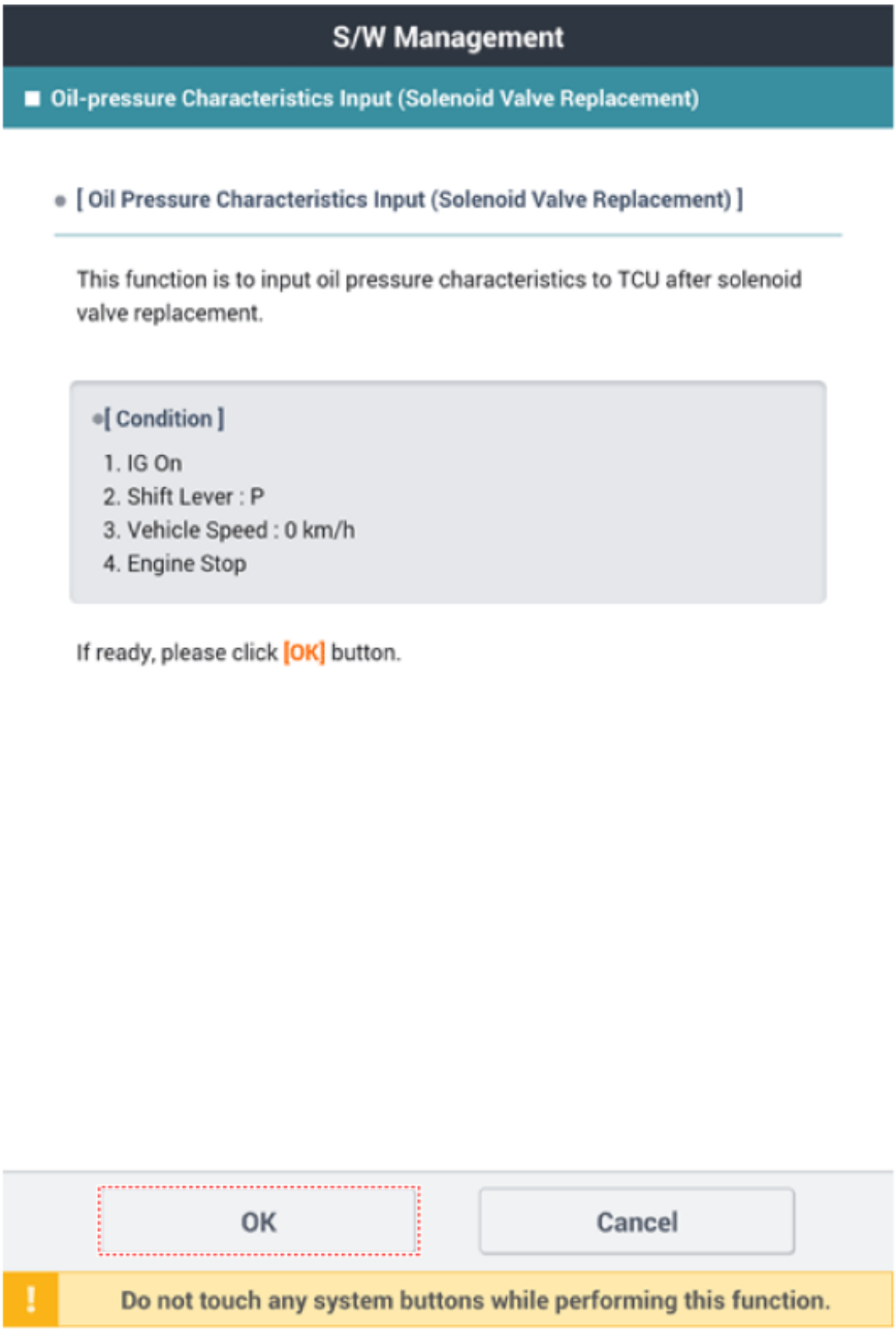
> **⚠ CAUTION**
>
> - Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

4. Reset the automatic transaxle adaptive values using the diagnostic tool.



5. Input the oil pressure characteristics using the diagnostic tool.


S/W Management
Systems
Components
Fold All
Automatic Transaxle
System Identification
Resetting Auto T/A Values
AT Adaptation Mode
Oil-pressure Characteristics Input (A/T Replacement)
Oil-pressure Characteristics BackUp & Input (TCU Replacement)
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
Do not touch any system buttons while performing this function.

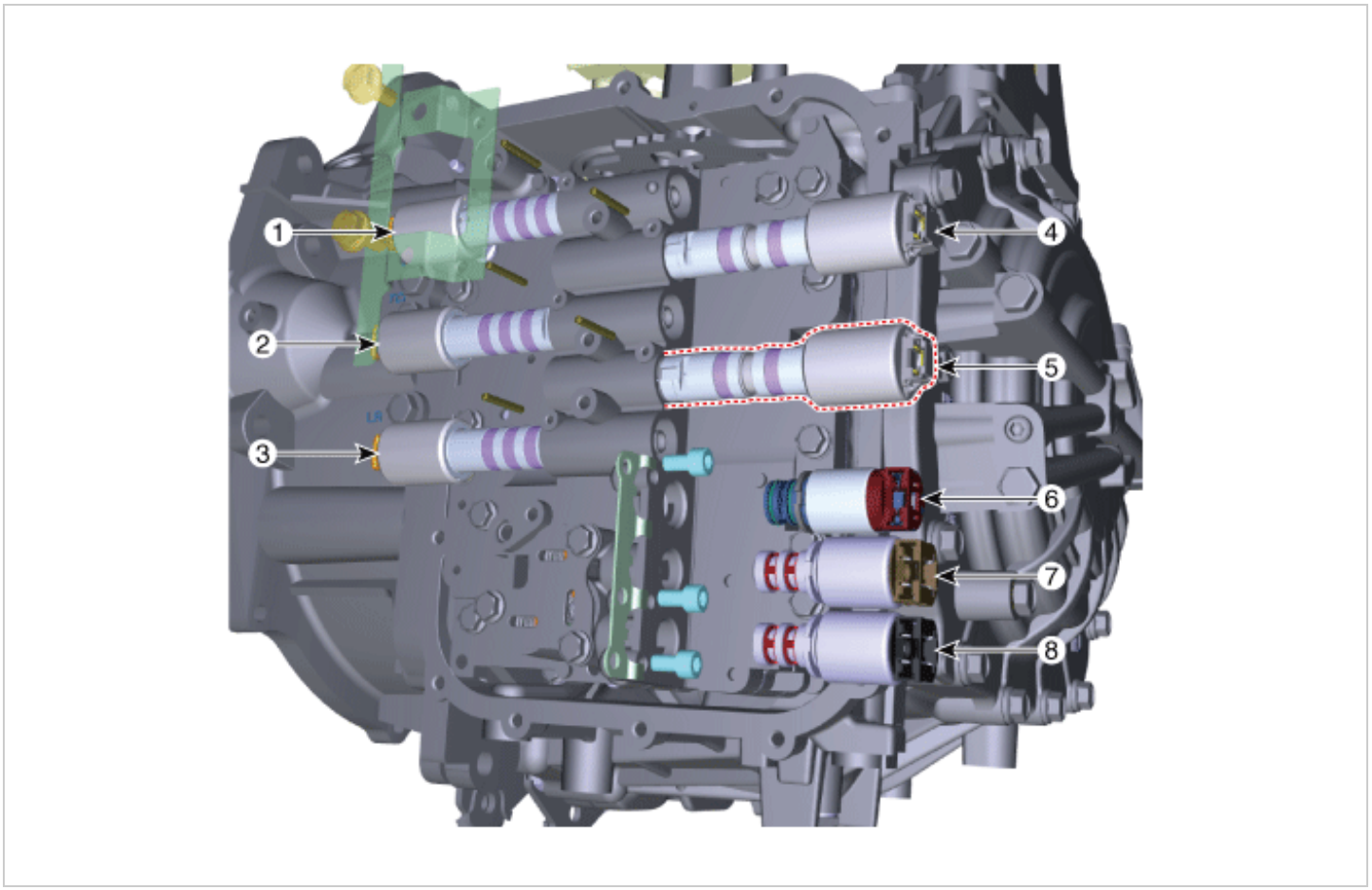

S/W Management
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
[Oil Pressure Characteristics Input (Solenoid Valve Replacement)]
This function is to input oil pressure characteristics to TCU after solenoid valve replacement.
[Condition]
1. IG On
2. Shift Lever : P
3. Vehicle Speed : 0 km/h
4. Engine Stop
If ready, please click [OK] button.
OK
Cancel
Do not touch any system buttons while performing this function.

6. In order to prevent start delay and gear shift shock during acceleration and start, perform TCM learning after replacing the solenoid valve. (Refer to Automatic Transaxle Control System - "Repair Procedures")

- Description

- When TCM supplies variable current to solenoid valve, hydraulic pressure of OD clutch & LR brake is controlled directly by solenoid valve.
- OD Clutch & LR Brake control solenoid valve is a Variable Force Solenoid (VFS) type.

- Components Location



1. 28 Brake control solenoid valve (28/B_VFS)
2. 46 Clutch control solenoid valve (46/C_VFS)
3. 37R Clutch control solenoid valve (37R/C_VFS)
4. UD Clutch control solenoid valve (UD/C_VFS)
5. OD Clutch & LR Brake control solenoid valve (OD/C & LR/B_VFS)
6. SS-A solenoid valve (SS-A_ON/OFF)
7. Torque converter control solenoid valve (T/CON_VFS)
8. Line pressure control solenoid valve (LINE_VFS)

- Specification

Clutch & Brake Control VFS

▷ Control type : Normally High

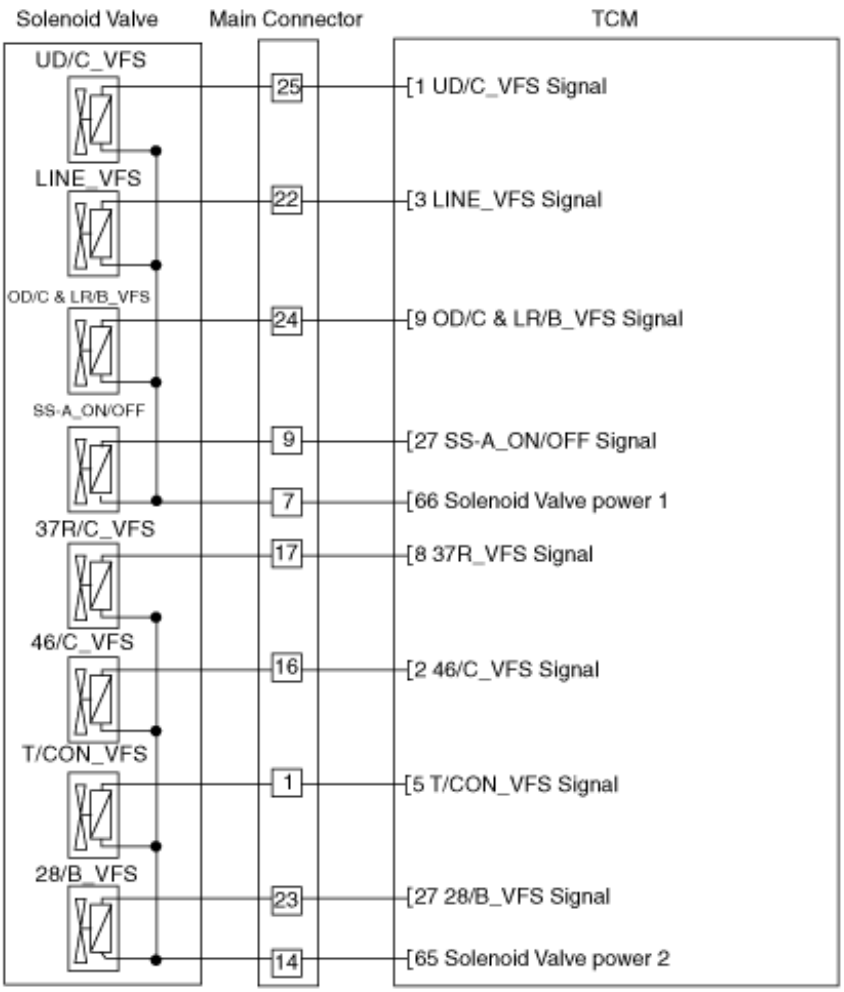
Item	Specification
Control pressure (kpa (kgf/cm, psi))	0 - 1,569.06 (0 - 16, 0 - 227.57)
Current (mA)	0 - 1,100
Internal resistance (Ω)	5.3 ± 0.3

▷ Operation of the solenoid valve

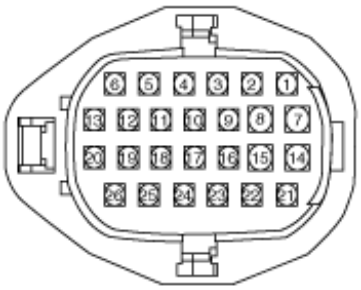
Division	Solenoid Valve	Clutch	Brake
	OD/C & LR/B_VFS	OD/C	LR/B
P			●
R			●
N			●
1			●
2	●		
3	●		
4	●		
5		●	
6		●	
7		●	
8		●	
Remark	● : Connected ◎ : Variable connected	●: Operation	

- Circuit Diagram

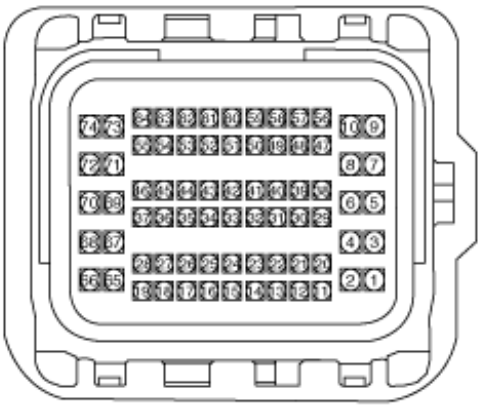
[Circuit Diagram]



[Connector]



[Main Connector]



[TCM Connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Cooling System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

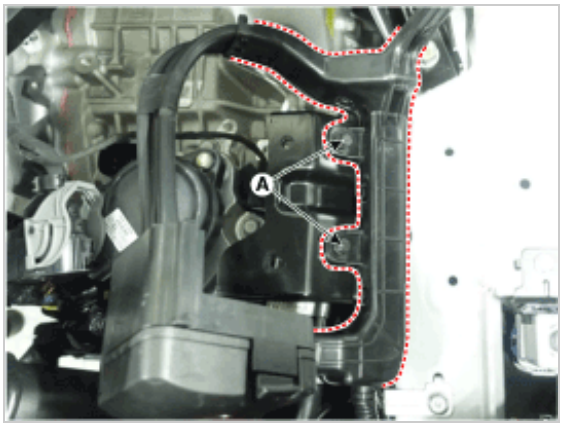
   Tightening torque :
   33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)

NOTICE

- Replace the gasket before reinstalling the drain plug.

7. Loosen the bolts (A) and then removing the wiring bracket.

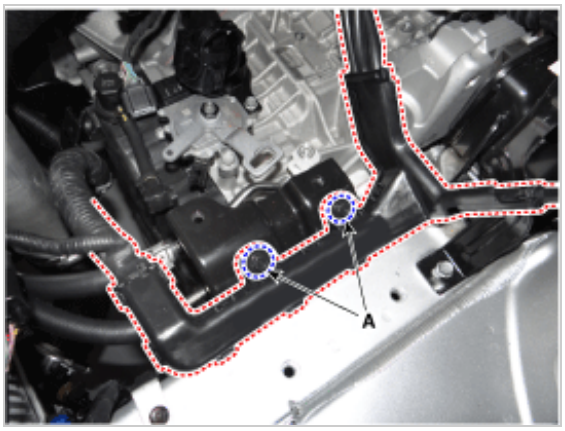
   Tightening torque :
   9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



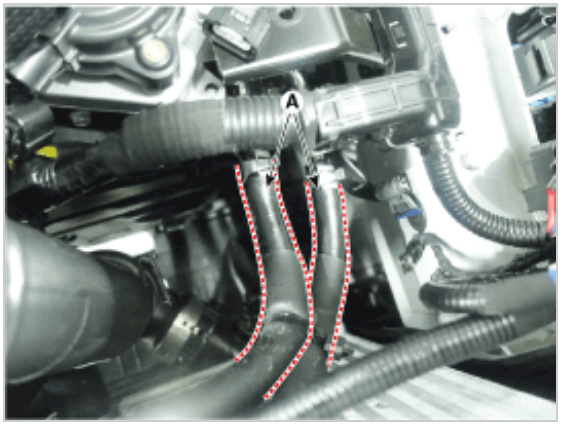
8. Loosen the bolts (A) and then removing the battery wiring bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Remove the ATF cooling hose (A).



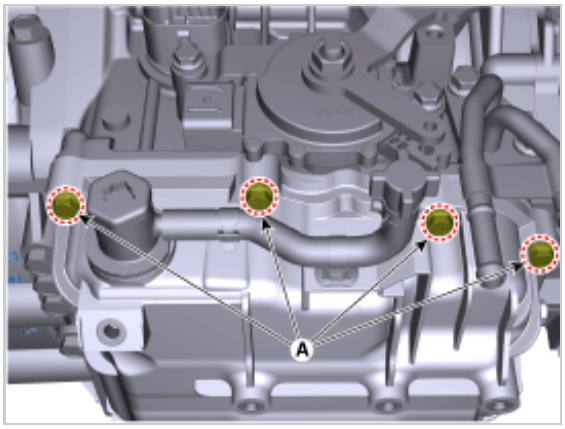
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



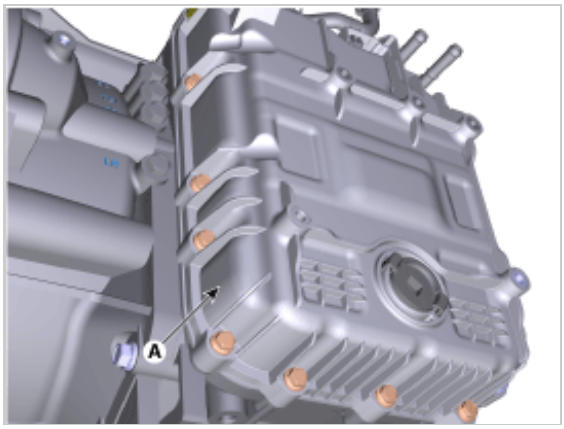
11. Loosen the bolts and then removing the valve body cover (A).

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

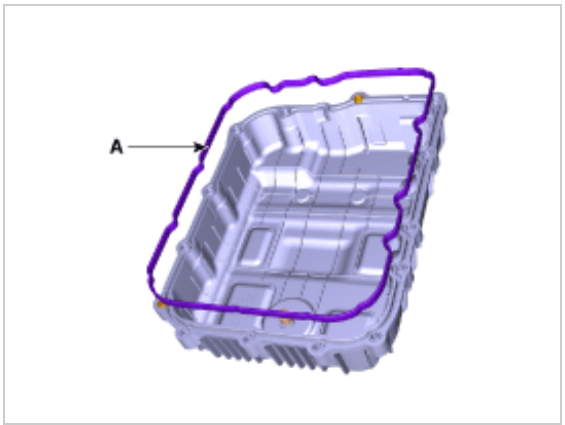
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

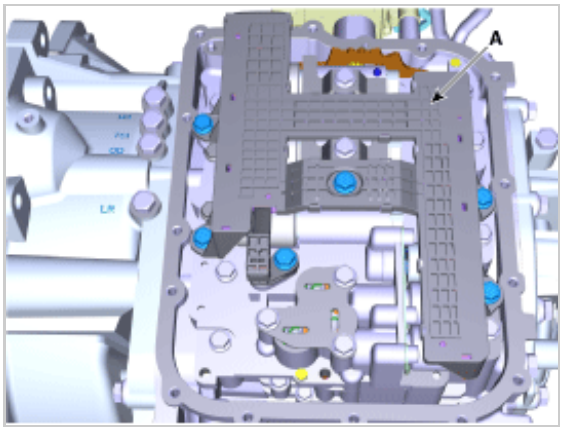
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then removing the main harness (A).

Tightening torque :

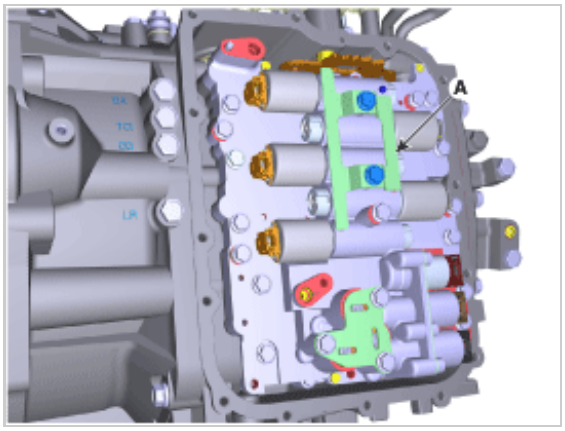
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



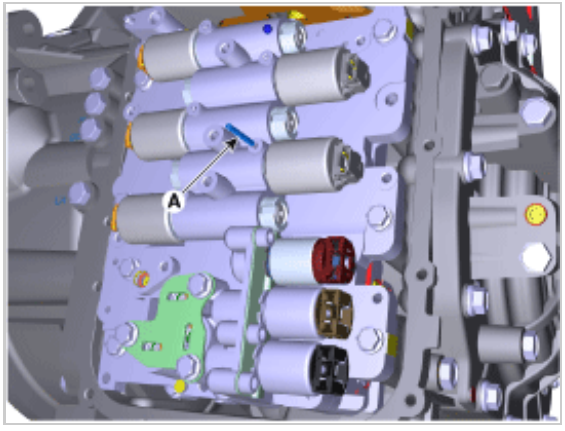
13. Remove the support bracket (A).

Tightening torque :

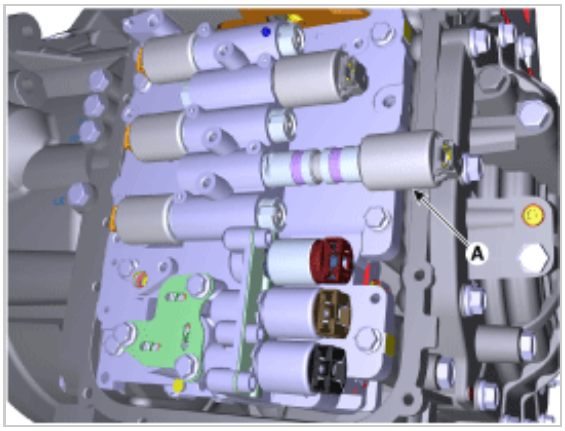
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



14. Remove the roller (A) using the magnet.



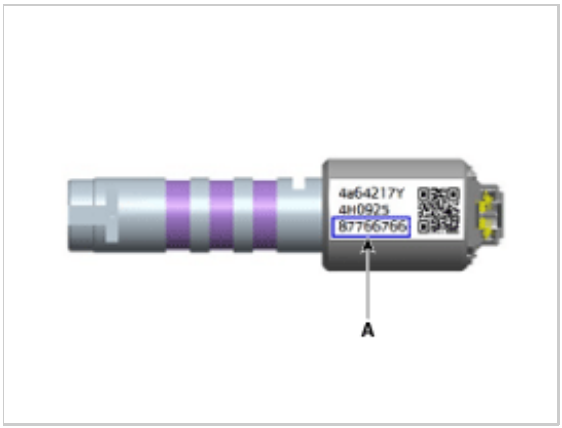
15. Remove the OD clutch & LR Brake control solenoid valve (A).



- Installation

⚠ CAUTION

- Note the value (A) carefully and check the value again before assembly.
- Inputting an invalid value may cause the abnormal shifting shock while TCM learning.

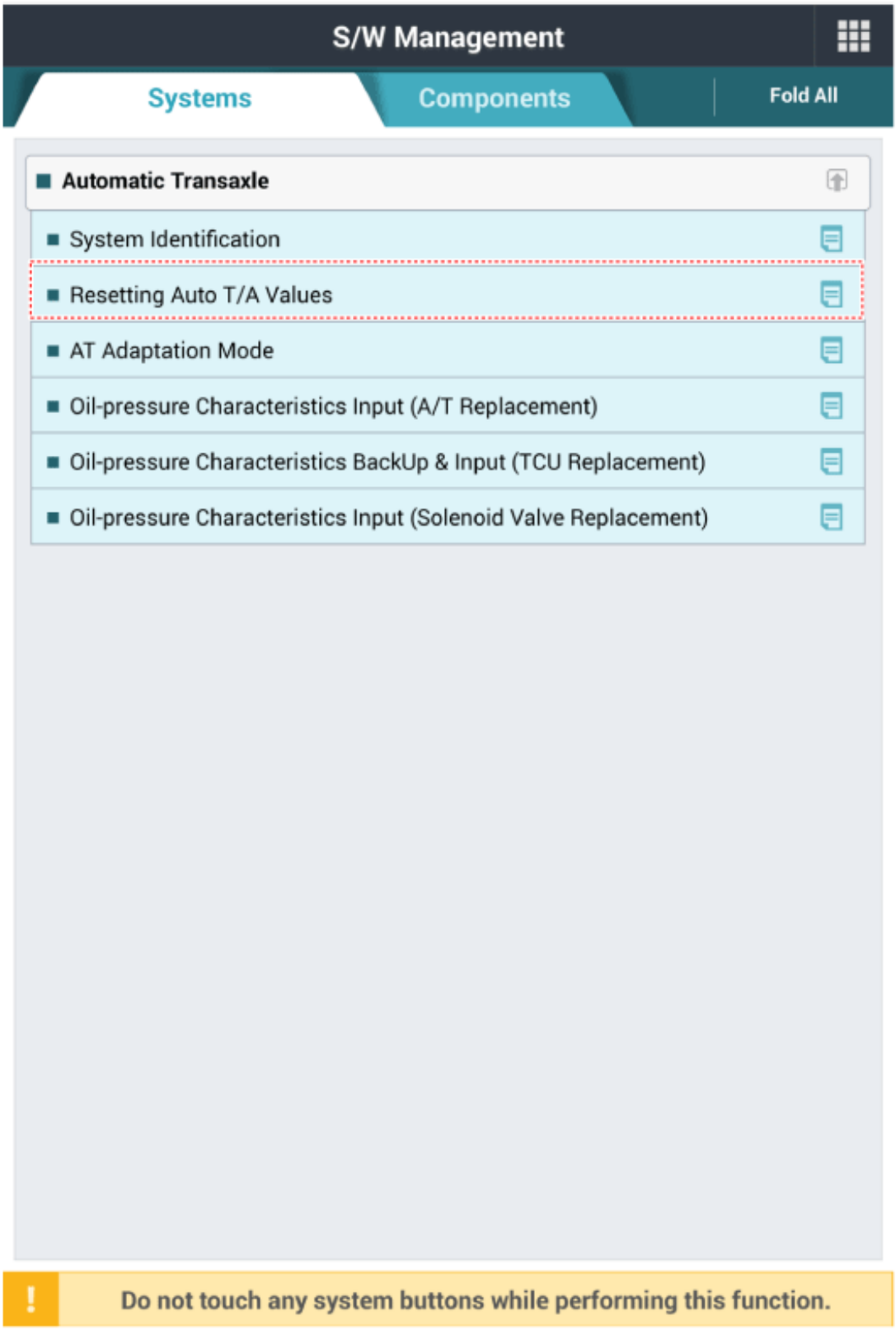


1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")
3. Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

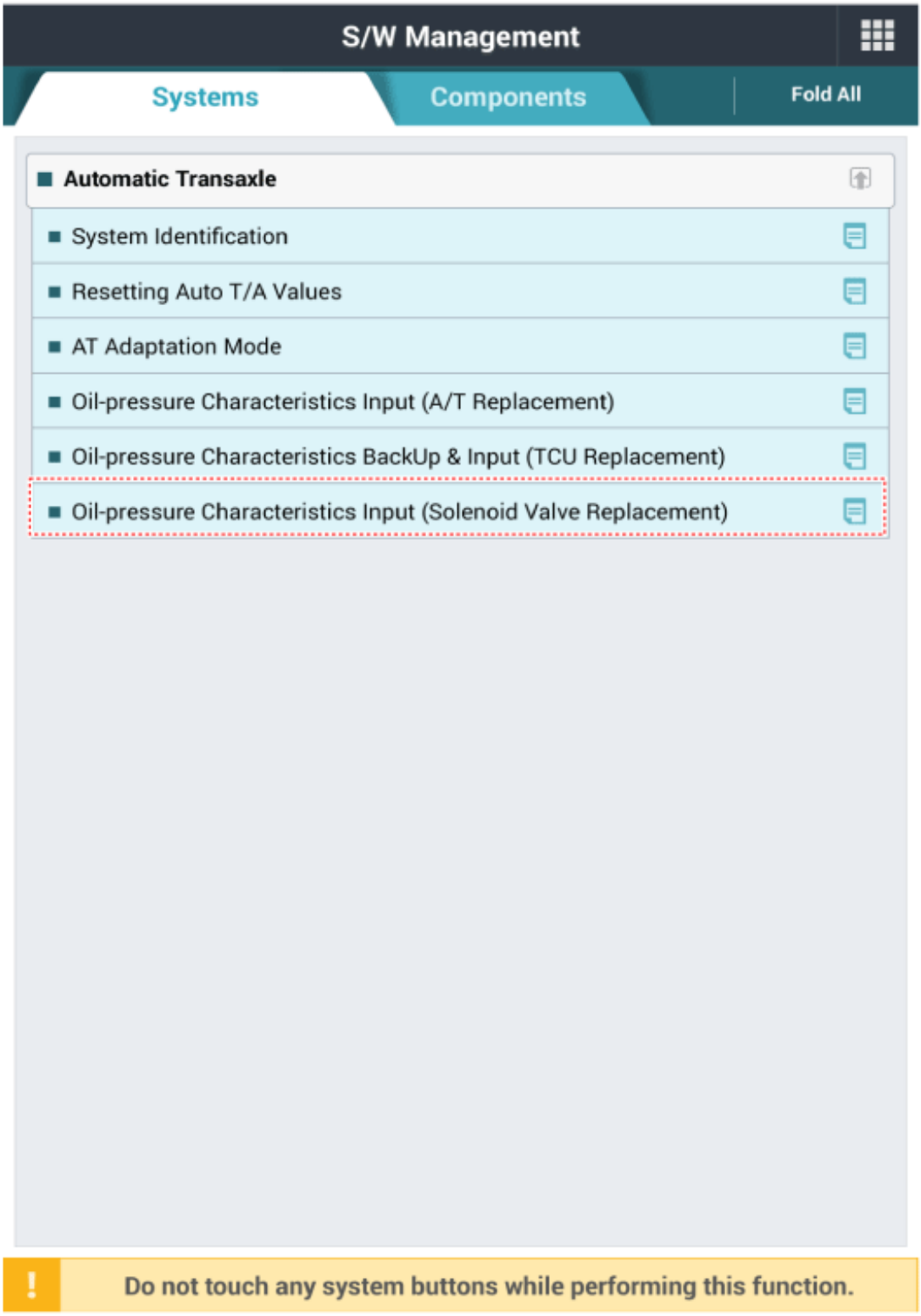
⚠ CAUTION

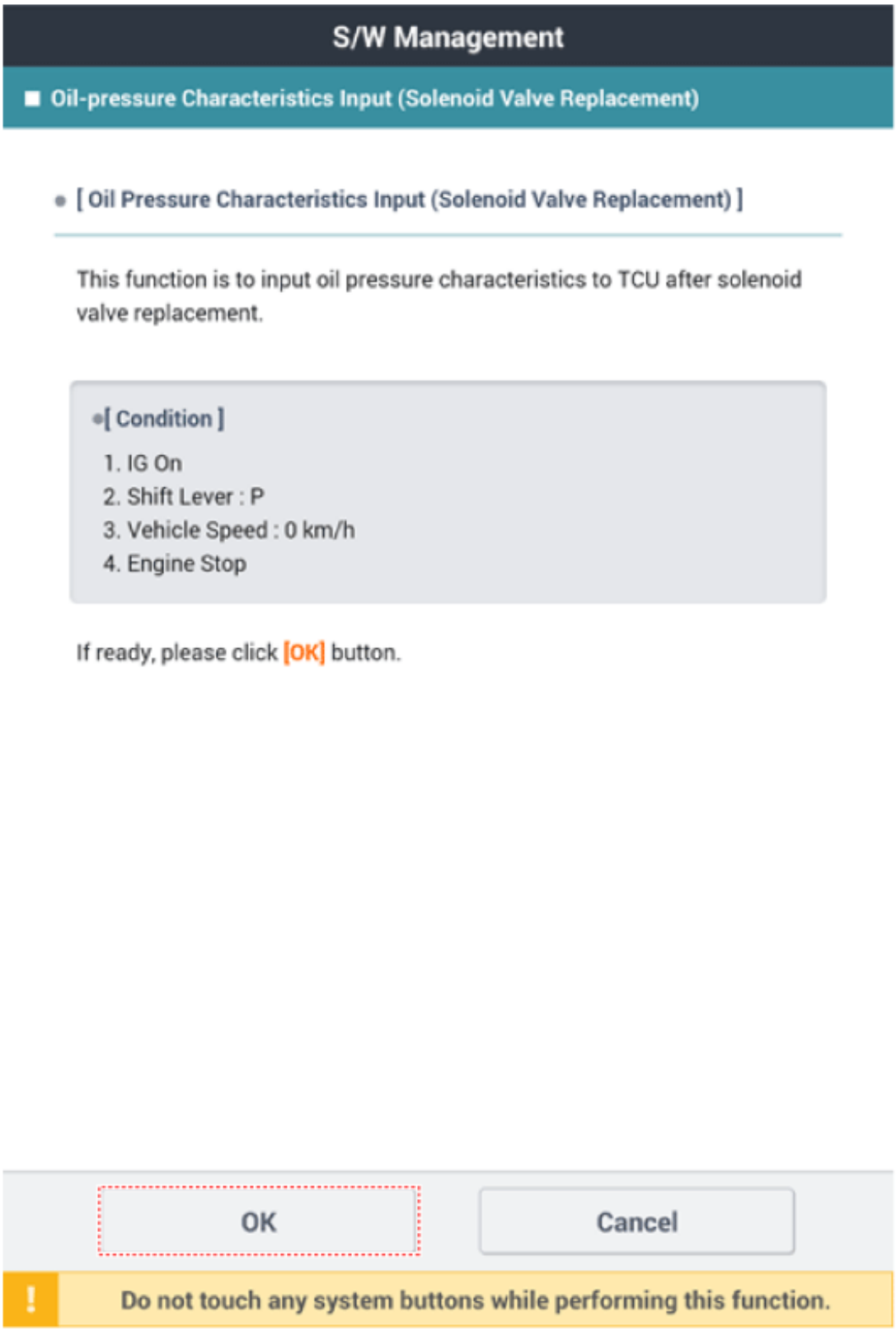
- Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

4. Reset the automatic transaxle adaptive values using the diagnostic tool.



5. Input the oil pressure characteristics using the diagnostic tool.

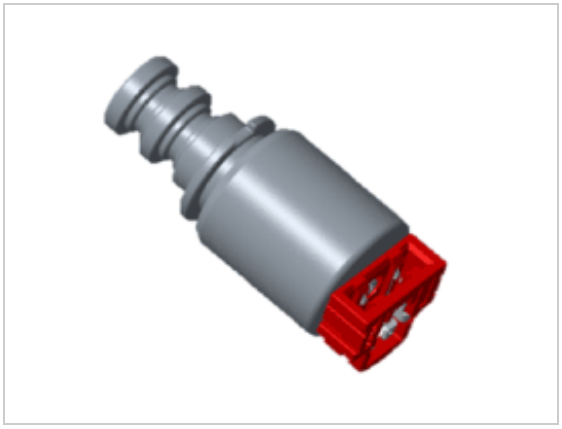

S/W Management
Systems
Components
Fold All
Automatic Transaxle
System Identification
Resetting Auto T/A Values
AT Adaptation Mode
Oil-pressure Characteristics Input (A/T Replacement)
Oil-pressure Characteristics BackUp & Input (TCU Replacement)
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
Do not touch any system buttons while performing this function.


S/W Management
Oil-pressure Characteristics Input (Solenoid Valve Replacement)
[Oil Pressure Characteristics Input (Solenoid Valve Replacement)]
This function is to input oil pressure characteristics to TCU after solenoid valve replacement.
[Condition]
1. IG On
2. Shift Lever : P
3. Vehicle Speed : 0 km/h
4. Engine Stop
If ready, please click [OK] button.
OK
Cancel
Do not touch any system buttons while performing this function.

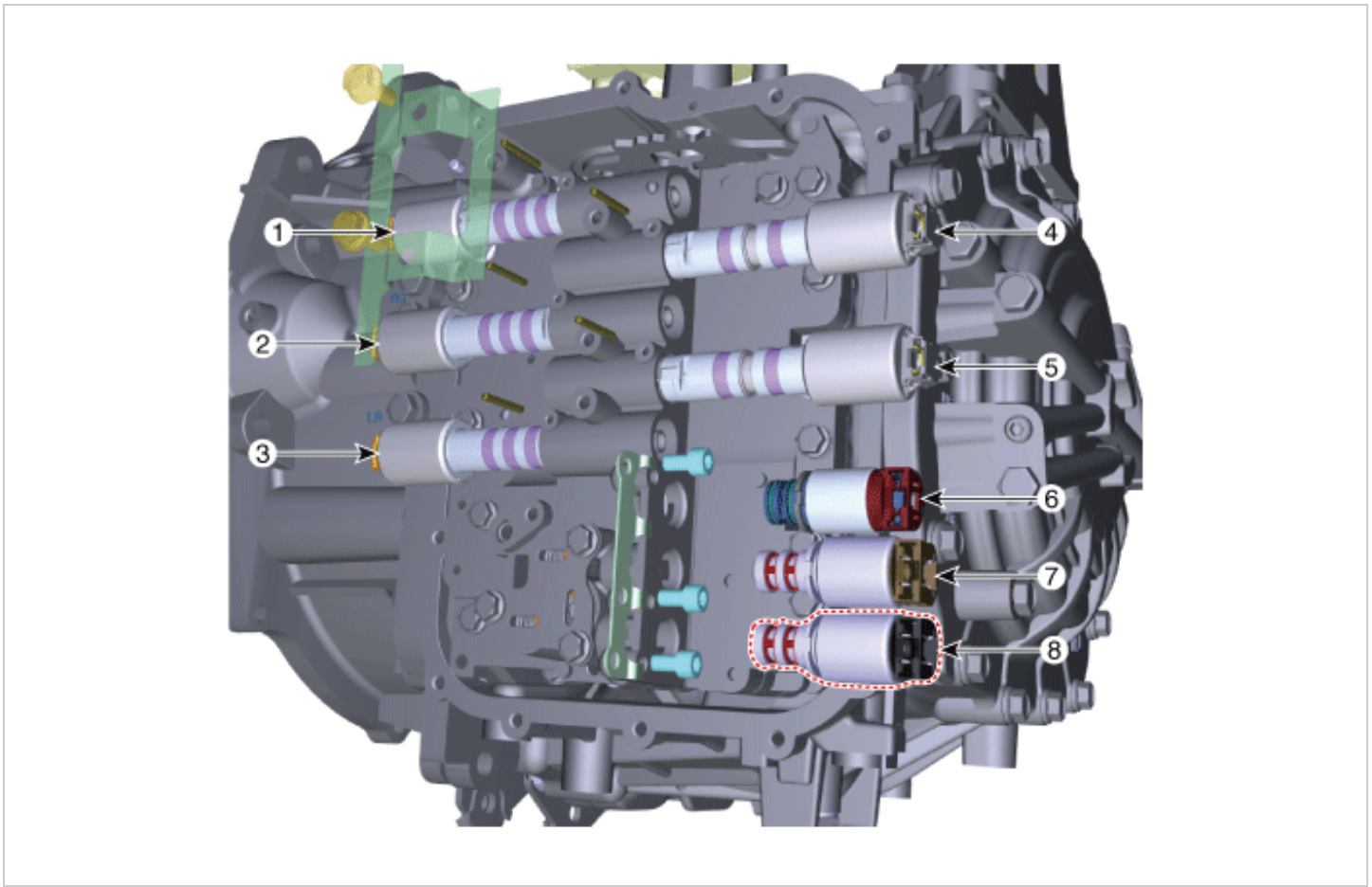
6. In order to prevent start delay and gear shift shock during acceleration and start, perform TCM learning after replacing the solenoid valve. (Refer to Automatic Transaxle Control System - "Repair Procedures")

- Description

• When TCM supplies variable current to solenoid valve, hydraulic pressure is controlled indirectly by solenoid valve.
• Line pressure solenoid valve is a Variable Force Solenoid (VFS) type.



- Components Location



1. 28 Brake control solenoid valve (28/B_VFS)
2. 46 Clutch control solenoid valve (46/C_VFS)
3. 37R Clutch control solenoid valve (37R/C_VFS)
4. UD Clutch control solenoid valve (UD/C_VFS)
5. OD Clutch & LR Brake control solenoid valve (OD/C & LR/B_VFS)
6. SS-A solenoid valve (SS-A_ON/OFF)
7. Torque converter control solenoid valve (T/CON_VFS)
8. Line pressure control solenoid valve (LINE_VFS)

- Specification

Clutch & Brake Control VFS

▷ Control type : Normally High

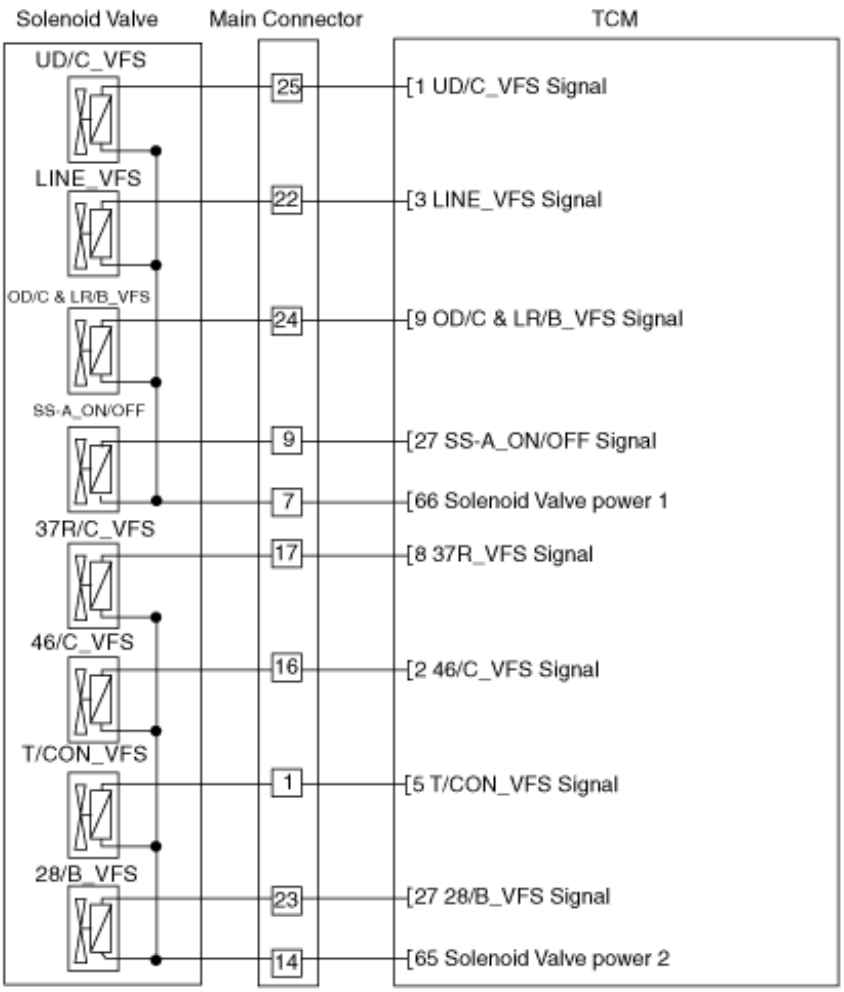
Item	Specification
Control pressure (kpa (kgf/cm, psi))	0 - 519.75 (0 - 5.3, 0 - 75.38)
Current (mA)	0 - 850
Internal resistance (Ω)	5.1 ± 0.3

▷ Operation of the solenoid valve

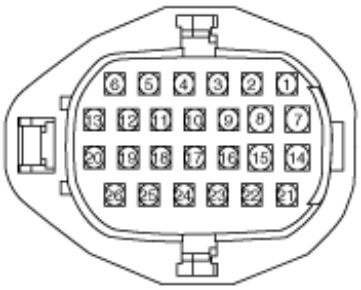
Division	Solenoid Valve
	LINE_VFS
P	◎
R	◎
N	◎
1	◎
2	◎
3	◎
4	◎
5	◎
6	◎
7	◎
8	◎
Remark	● : Connected
	◎ : Variable connected

- Circuit Diagram

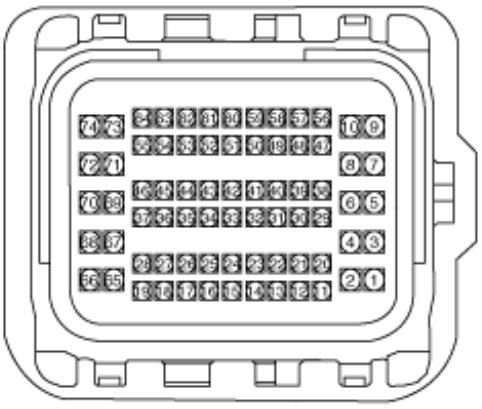
[Circuit Diagram]



[Connector]



[Main Connector]



[TCM Connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

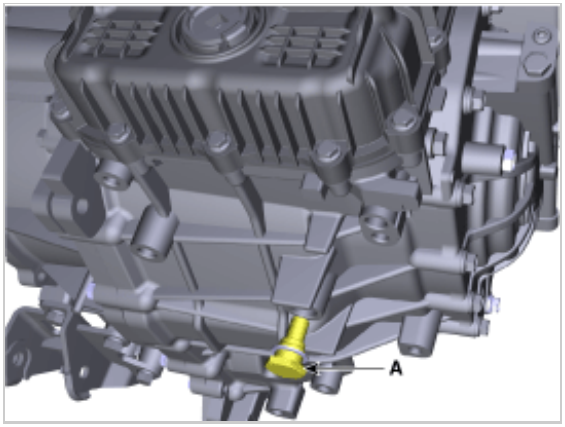
- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Cooling System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

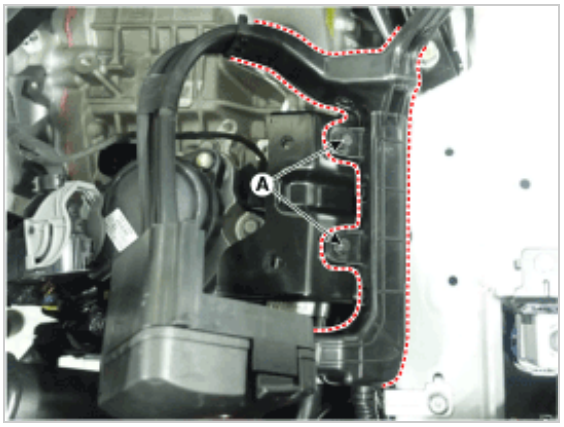
7. Loosen the bolts (A) and then removing the wiring bracket.

   Tightening torque :
   9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

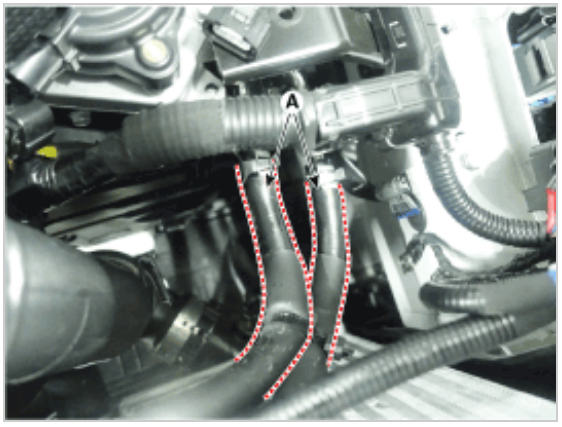
8. Loosen the bolts (A) and then removing the battery wiring bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Remove the ATF cooling hose (A).



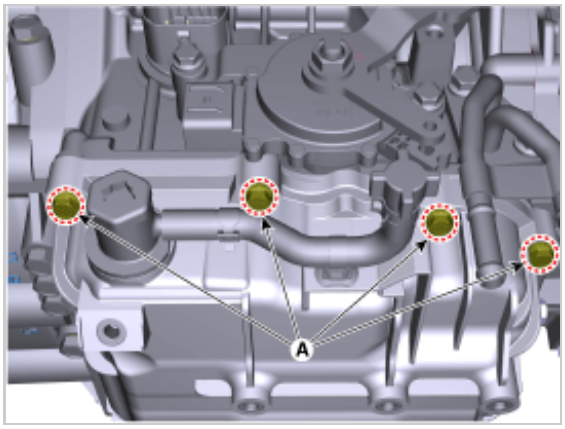
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



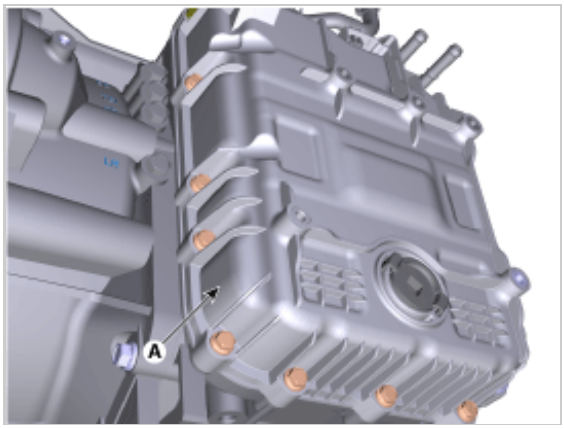
11. Loosen the bolts and then removing the valve body cover (A).

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

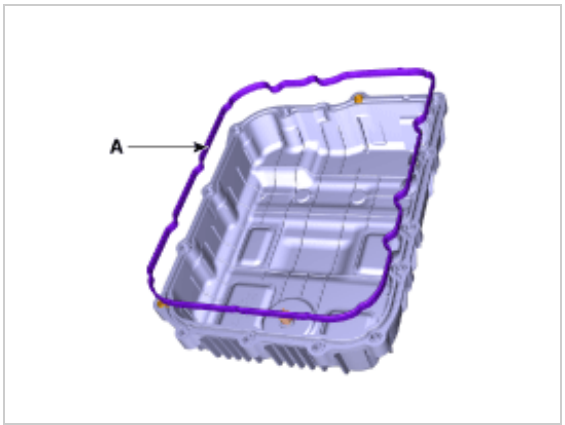
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

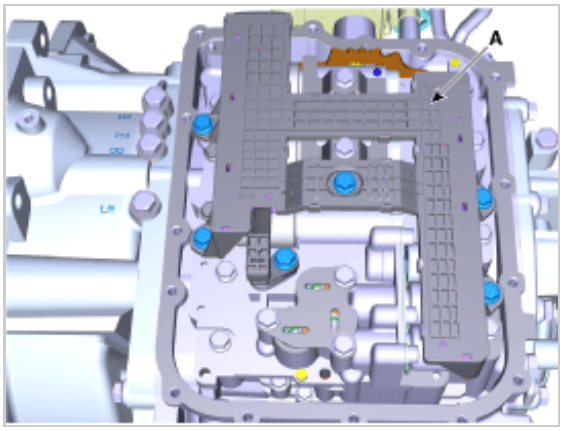
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then removing the main harness (A).

Tightening torque :

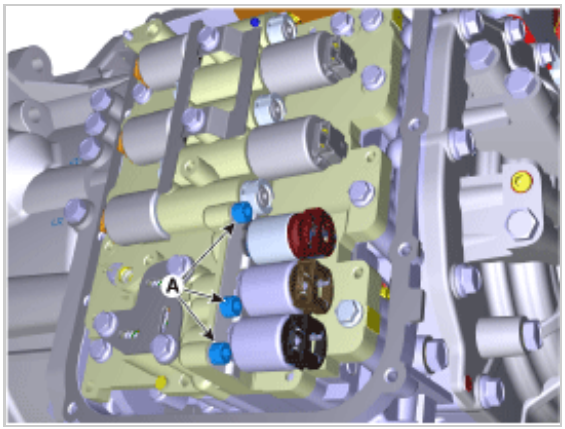
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



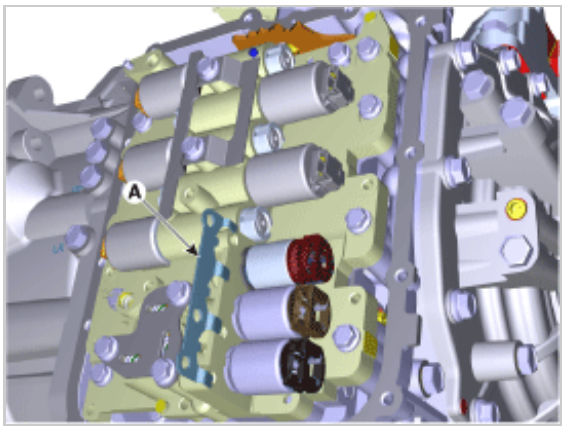
13. Loosen the support bracket mounting bolts (A).

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



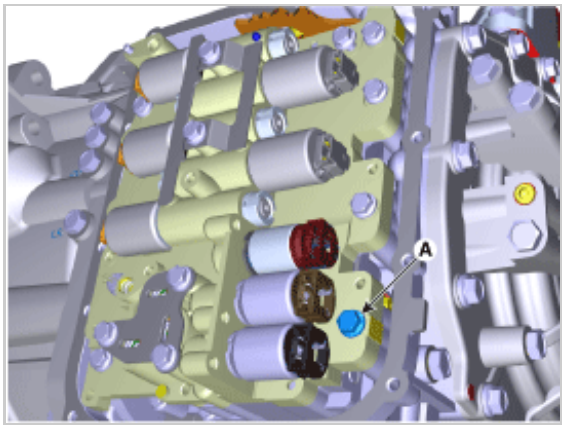
14. Remove the support bracket (A).



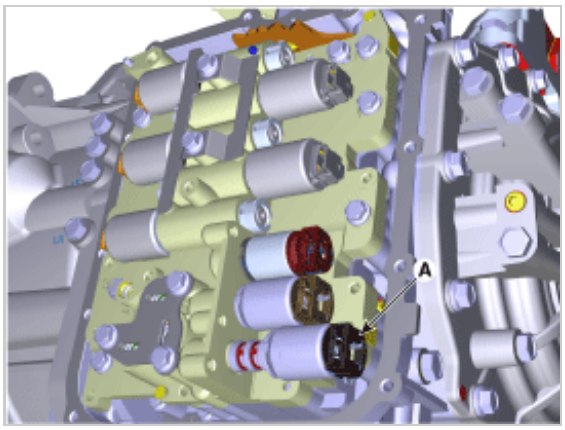
15. Loosen the bolt (A).

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



16. Remove the line pressure control solenoid valve (A).



- Installation

1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")
3. Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

> **⚠ CAUTION**
> • Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

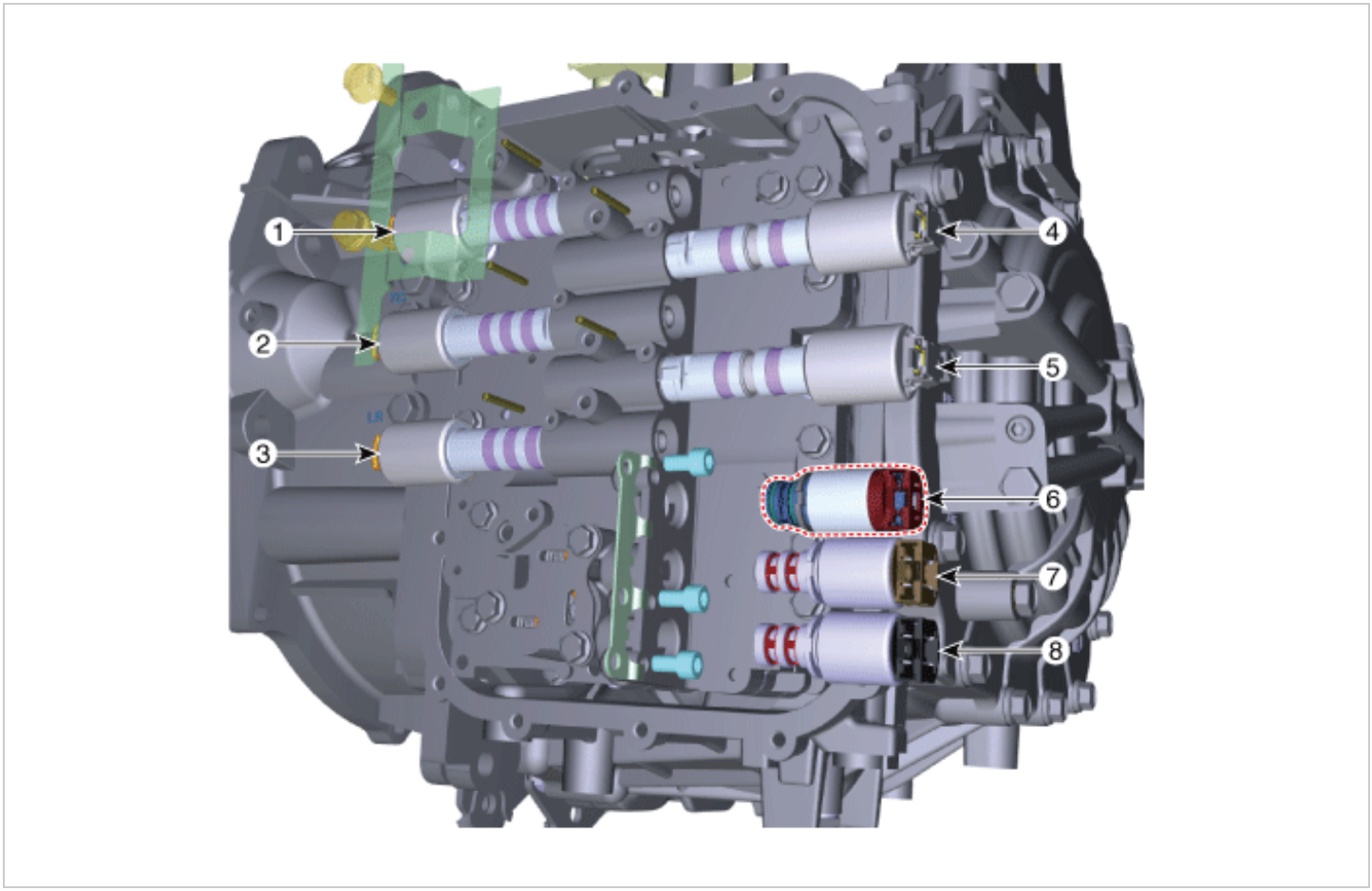
4. In order to prevent start delay and gear shift shock during acceleration and start, perform TCM learning after replacing the solenoid valve.
   (Refer to Automatic Transaxle Control System - "Repair Procedures")

> **⚠ CAUTION**
> • After ATF level check or exchange, be sure to remove residual ATF on transaxle case.
> (Be especially sure to remove residual ATF between automatic transaxle case and valve body cover)

- Description

- When TCM supplies variable current to solenoid valve, the solenoid valve operates and controls the speed range.
- SS-A solenoid valve is ON/OFF type.

- Components Location



1. 28 Brake control solenoid valve (28/B_VFS)
2. 46 Clutch control solenoid valve (46/C_VFS)
3. 37R Clutch control solenoid valve (37R/C_VFS)
4. UD Clutch control solenoid valve (UD/C_VFS)
5. OD Clutch & LR Brake control solenoid valve (OD/C & LR/B_VFS)
6. SS-A solenoid valve (SS-A_ON/OFF)
7. Torque converter control solenoid valve (T/CON_VFS)
8. Line pressure control solenoid valve (LINE_VFS)

- Specification

Clutch & Brake Control VFS

▷ Control type : ON/OFF

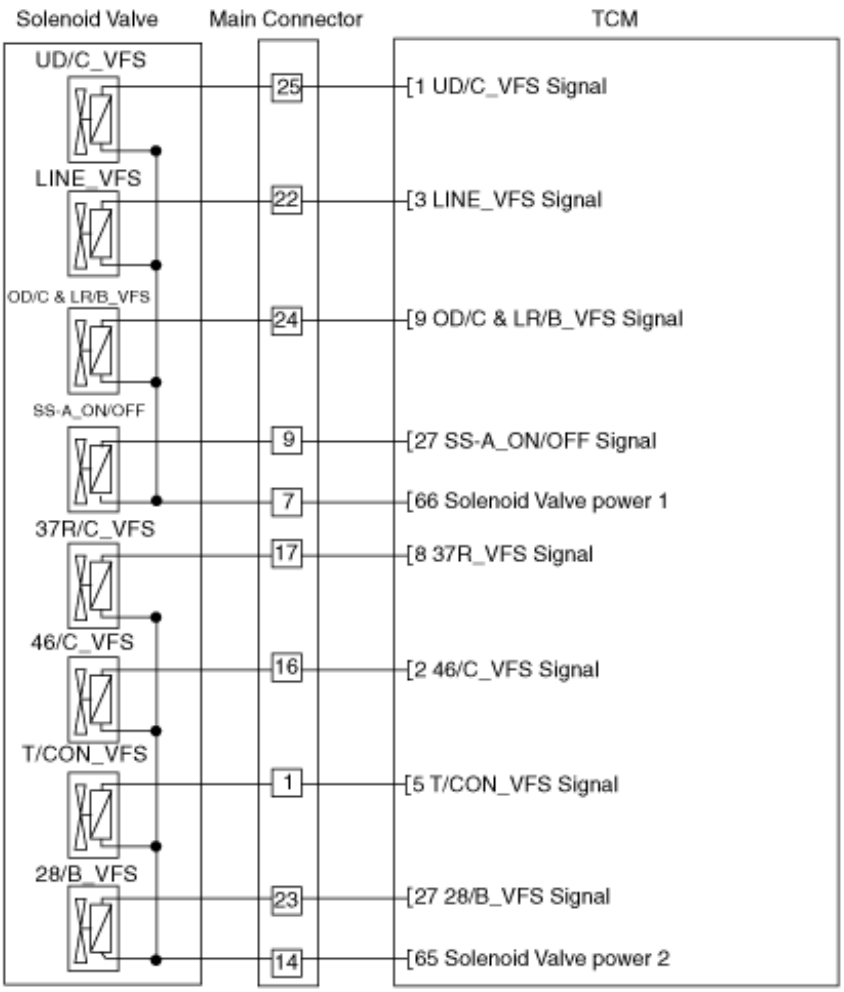
Item	Specification
Control pressure (kpa (kgf/cm, psi))	0 - 490.33 (0 - 5, 0 - 71.12)
Control voltage (V)	9 - 16
Internal resistance (Ω)	10 - 11

▷ Operation of the solenoid valve

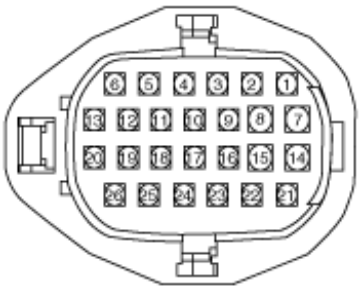
Division	Solenoid Valve	Clutch	Brake
	SS-A	OD/C	LR/B
P	●		●
R	●		●
N	●		●
1	●		●
2			
3			
4			
5		●	
6		●	
7		●	
8		●	
Remark	● : Connected	●: Operation	
	◎ : Variable connected		

- Circuit Diagram

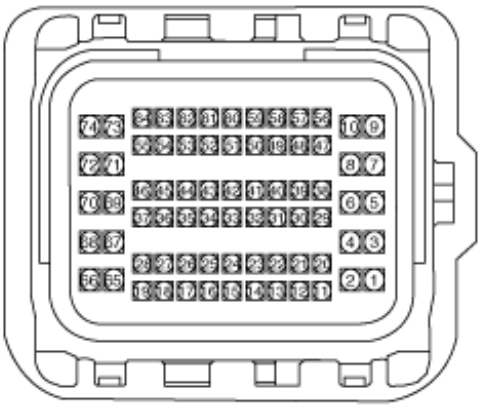
[Circuit Diagram]



[Connector]



[Main Connector]



[TCM Connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

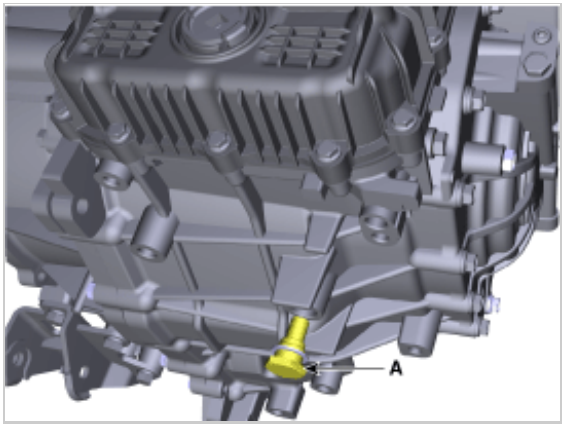
- Removal

⚠ CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Cooling System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

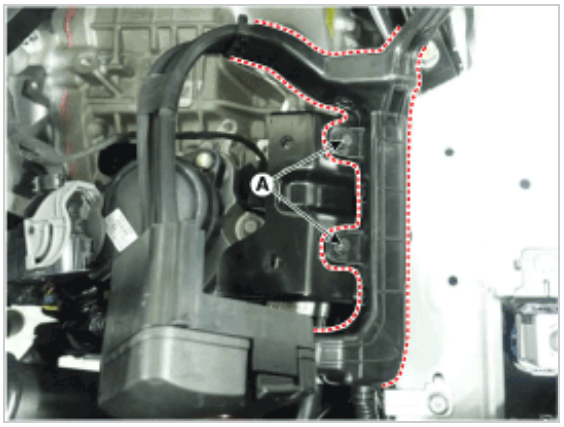
7. Loosen the bolts (A) and then removing the wiring bracket.

   Tightening torque :
   9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

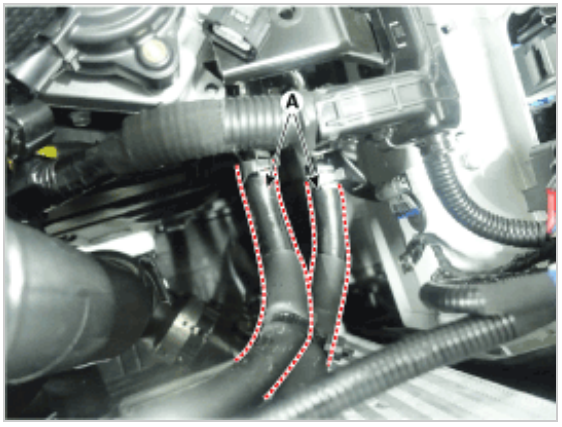
8. Loosen the bolts (A) and then removing the battery wiring bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Remove the ATF cooling hose (A).



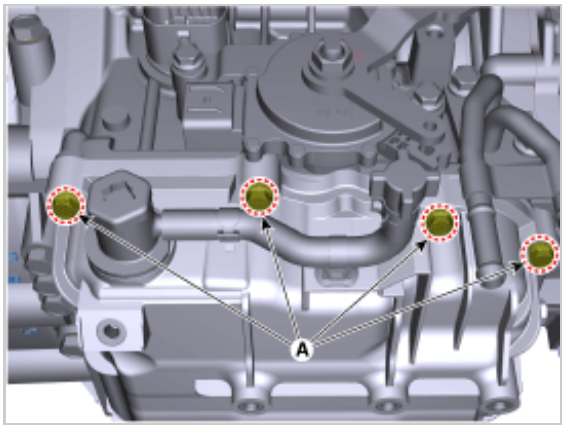
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



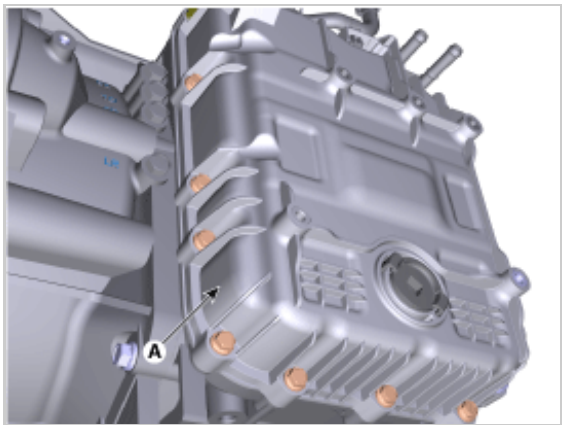
11. Loosen the bolts and then removing the valve body cover (A).

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

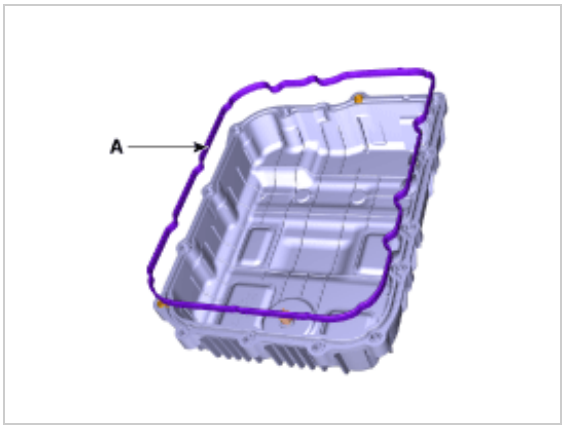
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

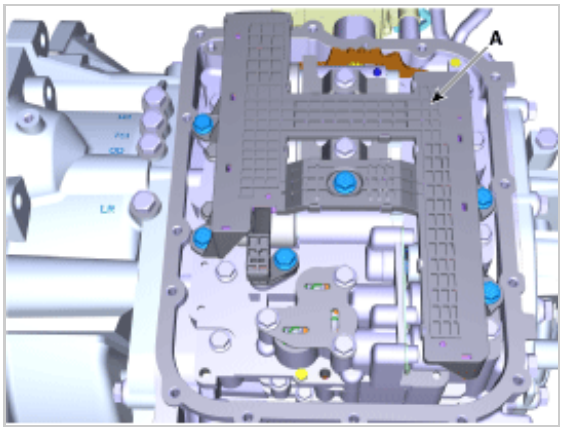
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then removing the main harness (A).

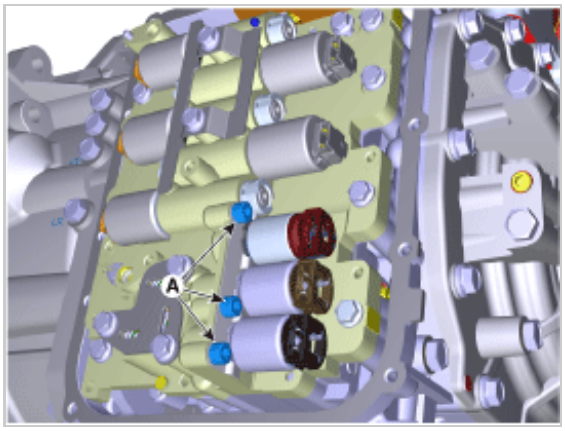
Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)

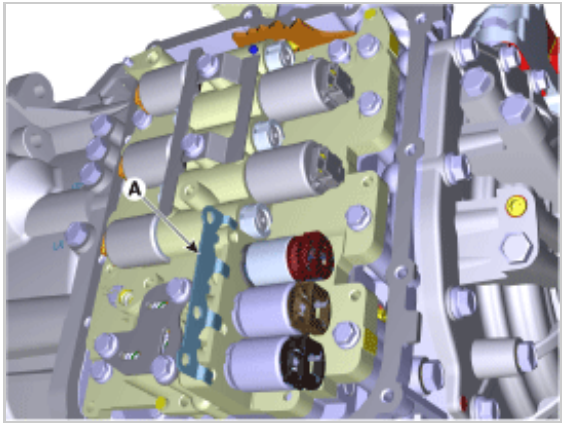


13. Loosen the support bracket mounting bolts (A).

Tightening torque :
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)

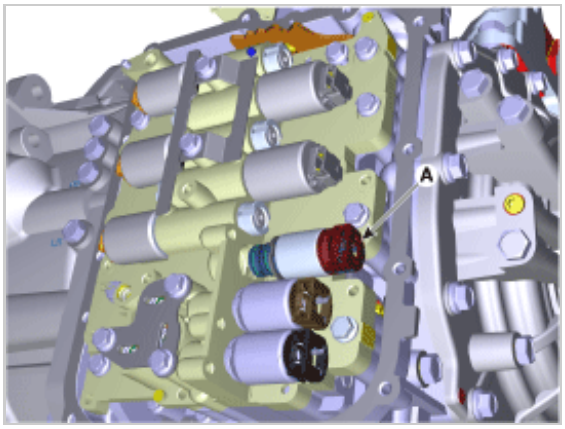


14. Remove the support bracket (A).



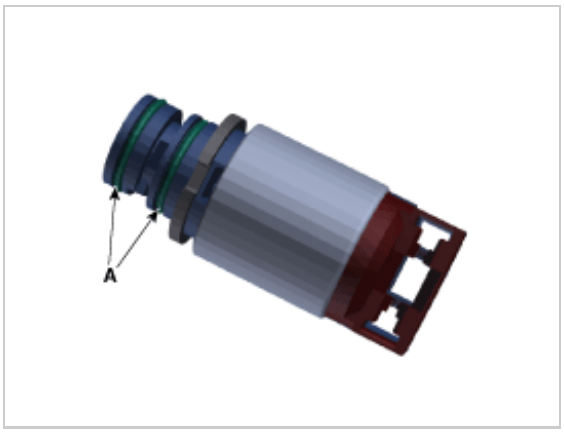
15. Remove the SS-A Solenoid Valve (A).

Tightening torque :
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



CAUTION

- When installing, apply the ATF oil or petroleum jelly to the O-rings (A) to prevent damage.



- Installation

1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")
3. Clear the diagnostic trouble codes (DTC) using the diagnostic tool.

CAUTION

- Even though disconnecting the battery negative terminal, the DTCs will not be cleared. So, be sure to clear the DTCs using the diagnostic tool.

4. In order to prevent start delay and gear shift shock during acceleration and start, perform TCM learning after replacing the solenoid valve.
   (Automatic Transaxle Control System - "Repair Procedures")

CAUTION

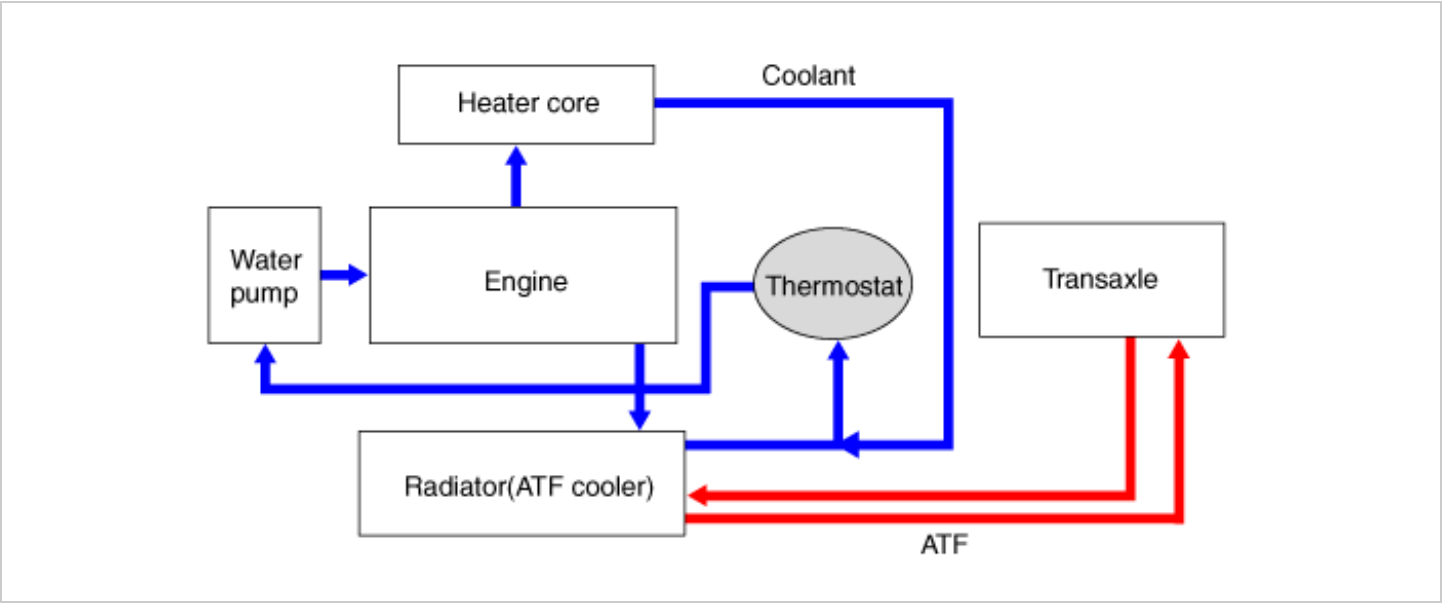
- After ATF level check or exchange, be sure to remove residual ATF on transaxle case.
  (Be especially sure to remove residual ATF between automatic transaxle case and valve body cover)

- Description

- Engine coolant is used for circulating heat in order to heat and cool the transaxle oil.

• Prevents over heating of the transaxle oil while the vehicle is moving.

Flow of the coolant



- Removal

Information

• ATF cooler is a unit with the radiator, so refer to radiator removal / installation procedures in the engine section.
(Refer to Engine Mechanical System - "Radiator")

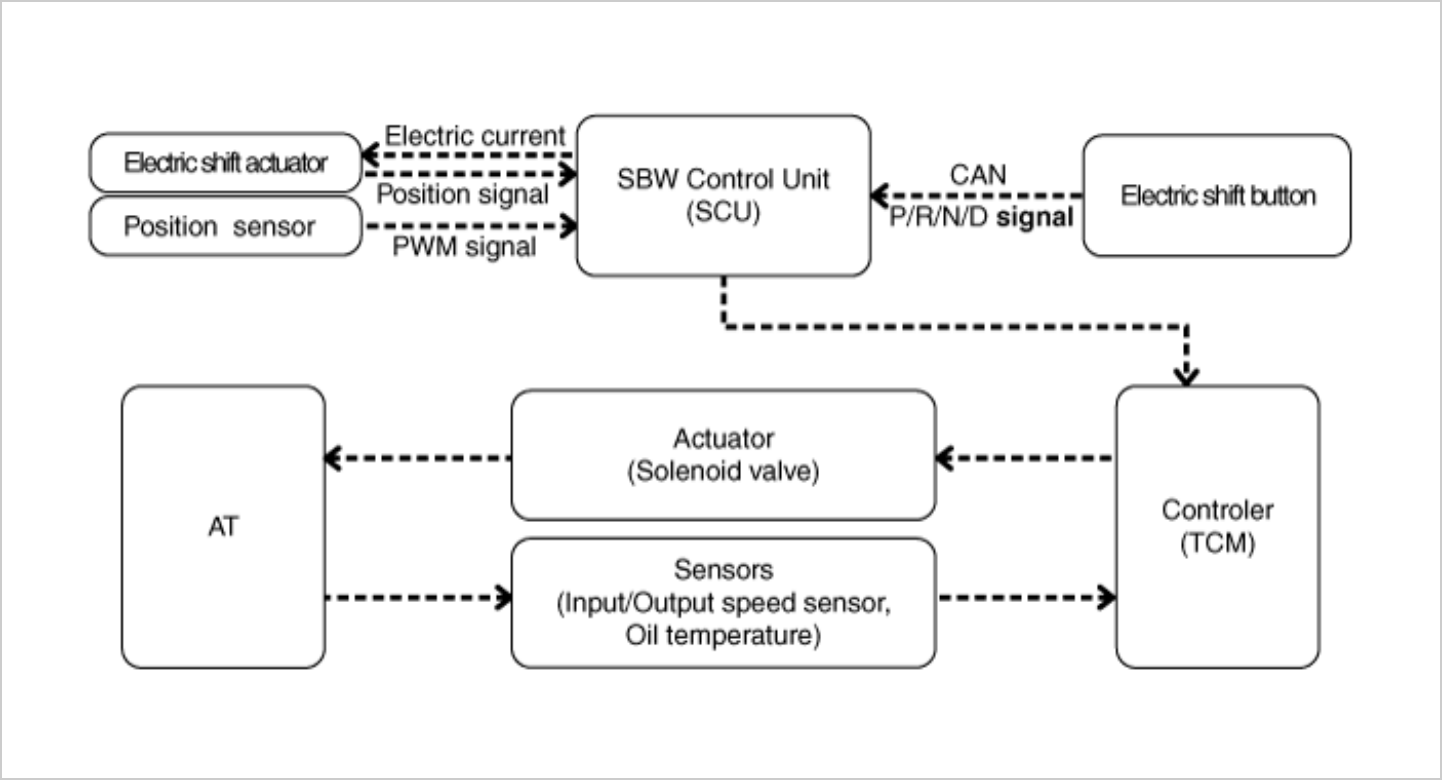
- Description

• Automatic transaxle system relies on various measurement data to determine the current control status and extrapolate the necessary compensation values.

• These values are used to control the actuators and achieve the desired control output.

• If a problem with the drivetrain, including the transaxle, has been identified, perform self-diagnosis and basic transaxle inspection (oil and fluid inspection) and then check the control system's components using the diagnosis tool.

Control System Composition

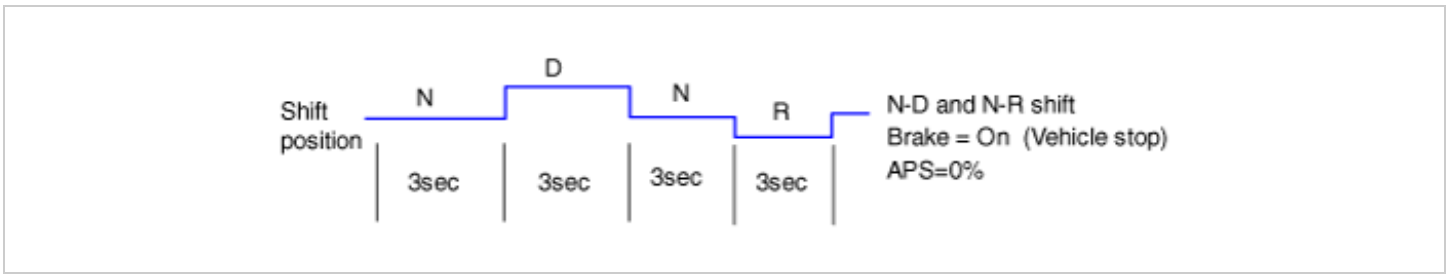


Automatic Transaxle System (A8LF1)

- Adjustment

TCM Learning

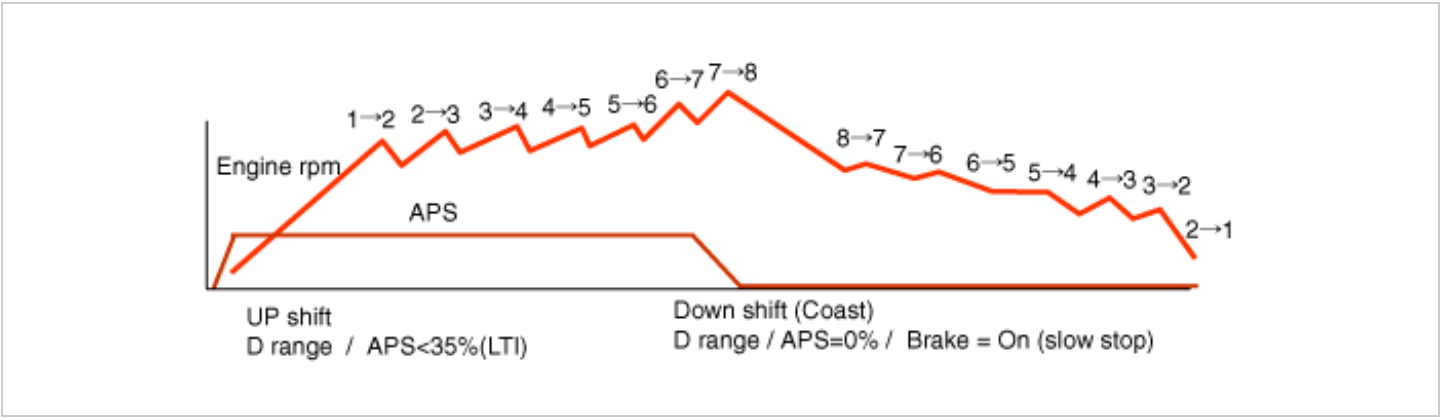
1. Overview and purpose of learning
   1) The purpose is to ensure the initial operation safety by correcting the oil pressure differences between transmissions.
   2) For relearning of TCM, process relearning by deleting existing contents using diagnostic tool when there is shift shock at gears 1-2-3-4-5-6-7-8.
2. In the following case, TCM learning is required.
   1) Automatic transaxle assembly replacement
   2) TCM replacement
   3) TCM upgrade
3. TCM learning procedure
   1) Condition : ATF temperature 35 - 95°C (95 - 203°F)
   2) Stop learning
      - Repeat the shift pattern shown below five times or more with the brake stepped on.



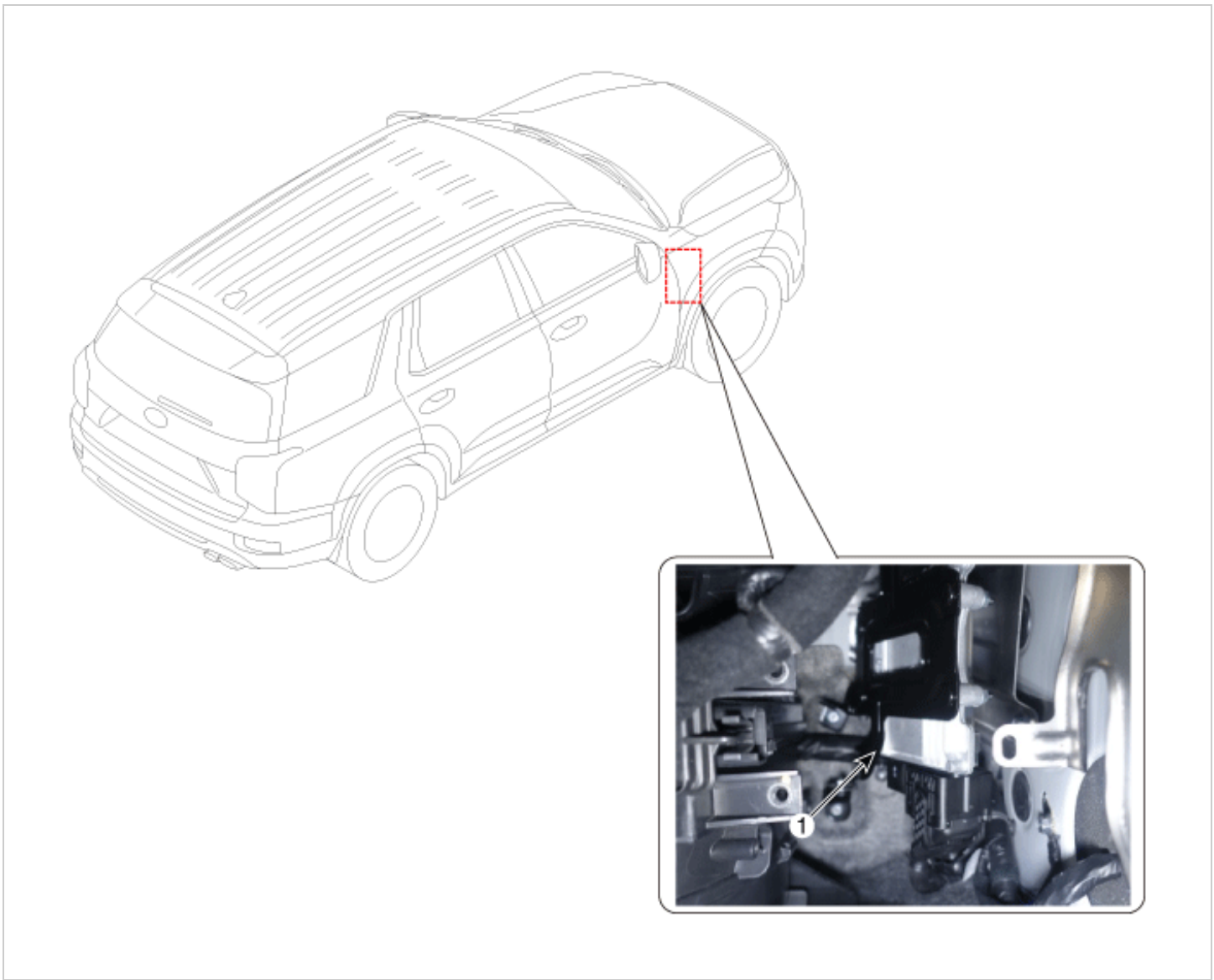
   3) Driving relearn
      - Maintain the throttle open to a constant level with the gear in D position and increment from 1st to 5th gear within 1500 ~ 2500 RPM of engine and decelerate slowly.

      With (ON, throttle opening: 0%), decrement from 8th to 1st gear.

- Upshift throttle opening : 15 - 35% (a proper value for making upshift within 1500 - 2500RPM of engine)



- Components Location



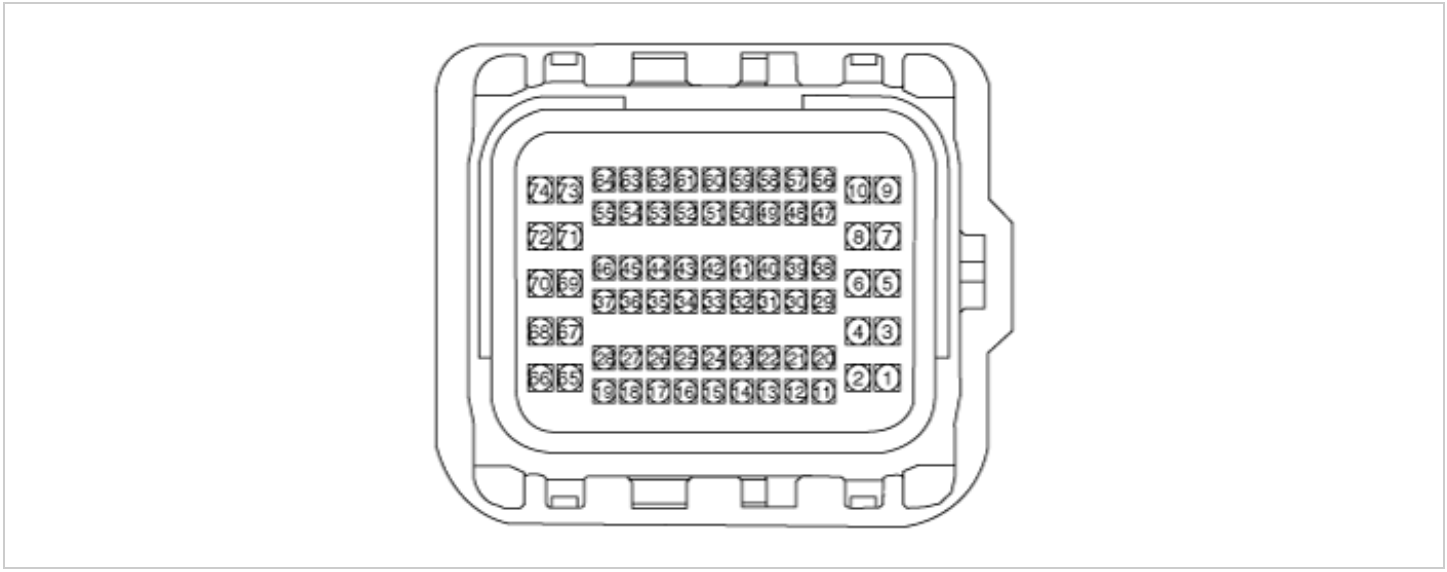
1. Transaxle control module(TCM)

- Description

- Monitoring the vehicle's operating conditions to determine the optimal gear setting.
- Performing a gear change if the current gear setting differs from the identified optimal gear setting.
- Determining the need for damper clutch (D/C) activation and engages the clutch accordingly.
- Calculating the optimal line pressure level by constantly monitoring the torque level and adjusts the pressure accordingly.
- Diagnosing the automatic transaxle for faults and failures.

Automatic Transaxle System (A8LF1)

- TCM Connector



- TCM terminal function

Pin	Description	Pin	Description
1	UD Clutch control solenoid valve (UD/C_VFS)	34	Input speed sensor signal
2	46 Clutch control solenoid valve (46/C_VFS)	43	CAN High
3	Line pressure control solenoid valve (LINE_VFS)	52	CAN Low
5	Torque converter control solenoid valve (T/CON_VFS)	56	Output speed sensor power
7	28 Brake control solenoid valve (28/B_VFS)	57	Middle speed sensor power
8	37R Clutch control solenoid valve (37R/C_VFS)	58	Input speed sensor power
9	OD Clutch & LR Brake Clutch control solenoid valve (OD/C & LR/B_VFS)	65	Solenoid valve power 1 (2, 5, 7, 8)
17	IG.1	66	Solenoid valve power 2 (1, 3, 9, 27)
25	Oil temperature sensor (+)	67	Power

26	Oil temperature sensor (-)	68	Power
27	SS-A solenoid valve (SS-A_ON/OFF)	71	Ground
31	Middle speed sensor signal	73	Ground
32	Output speed sensor signal	74	Ground

- TCM terminal input / output signal

Pin	Description	Condition	Input / output value	
			Type	Level
1	UD Clutch control solenoid valve (UD/C_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
2	46 Clutch control solenoid valve (46/C_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
3	Line pressure control solenoid valve (LINE_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
5	Torque converter control solenoid valve (T/CON_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
7	28 Brake control solenoid valve (28/B_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
8	37R Clutch control solenoid valve (37R/C_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
9	OD Clutch & LR Brake Clutch control solenoid valve (OD/C & LR/B_VFS)	-	Output	0V/Battery voltage level
				9V < Battery voltage level < 16V
17	IG.1	On	Power	0V/Battery voltage level
		Off		9V < Battery voltage level < 16V
25	Oil temperature sensor (+)	ON	Input	0V/5V
		OFF		
26	Oil temperature sensor (-)	-	Ground	0V
27	SS-A solenoid valve (SS-A_ON/OFF)	High	Output	0V/Battery voltage level
		Low		9V < Battery voltage level < 16V
31	Middle speed sensor signal	High	Input	0.7V/1.4V
		Low		
32	Output speed sensor signal	High	Input	0.7V/1.4V
		Low		
34	Input speed sensor signal	High	Input	0.7V/1.4V
		Low		
56	Output speed sensor power	ON	Power	0V/9V
		OFF		
57	Middle speed sensor power	On	Power	0V/9V
		Off		
58	Input speed sensor power	On	Power	0V/9V
		Off		
65	Solenoid valve power 1	-	Power	0V/Battery voltage level
				9V < Battery voltage level < 16V
66	Solenoid valve power 2	-	Power	0V/Battery voltage level
				9V < Battery voltage level < 16V
67	Power	On	Power	0V/Battery voltage level
		Off		9V < Battery voltage level < 16V
68	Power	On	Power	0V/Battery voltage level

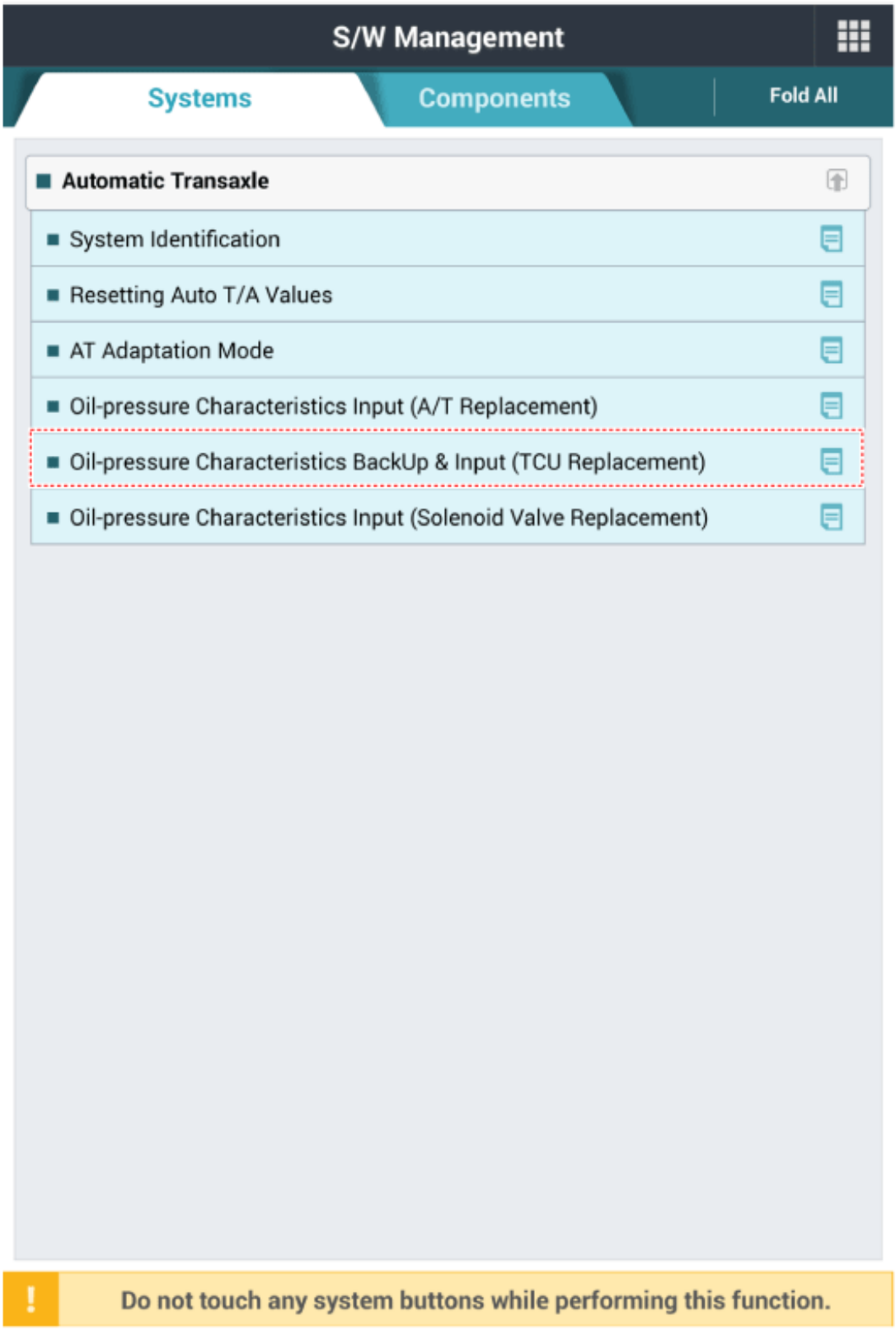
		Off		9V < Battery voltage level < 16V
71	Ground	-	Ground	0V
73	Ground	-	Ground	0V
74	Ground	-	Ground	0V

- Inspection

1. TCM ground circuit test : Measure the resistance between TCM and chassis ground.
   (Inspect the terminal connected to the chassis ground with the back of harness connector as the inspection point of TCM side.)
   Specification : Below 1Ω
2. TCM connector test : Disconnect the TCM connector and visually check the ground terminals on TCM side and harness side for bent pins or poor contact pressure.
3. If problem is not found in Steps 1 and 2, the TCM could be faulty.
   If so, replace the TCM with a new one, and then check the vehicle again. If the vehicle operates normally then the problem was likely with the TCM.
4. Reinspection of original TCM : Install the original TCM (probably broken) into a known-good vehicle and check the vehicle. If the problem occurs again, replace the original TCM with a new one.
   If the problem does not reoccur, this is an intermittent problem and other part may be faulty.

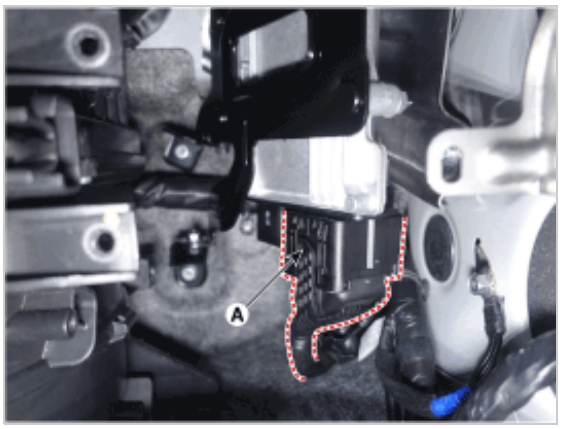
- Removal

1. Perform the oil pressure characteristics backup procedure using the diagnostic tool when replacing with a new TCM.

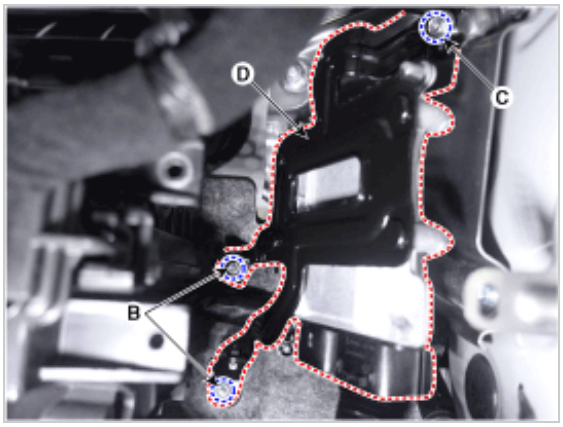


2. Turn ignition switch OFF and disconnect the negative (-) battery cable.
3. Remove the glove box.
   (Refer to Body (Interior and Exterior) - "Glove Box")
4. Remove the integrated body control unit (IBU).
   (Refer to Body Electical System - "Integrated Body Control Unit (IBU)")

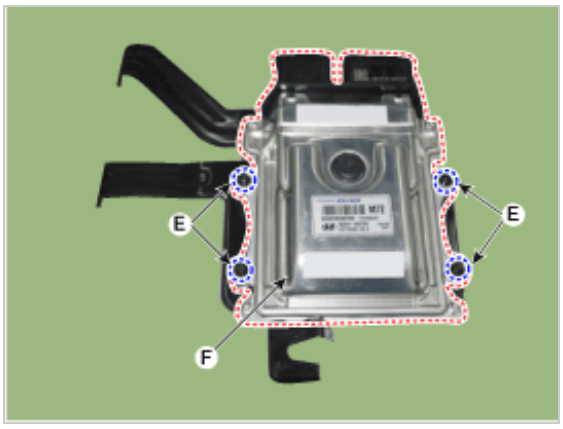
5. Remove the intergrated control module (ICM) relay box.
   (Refer to Body Electrical System - "Fuse and Relay")
6. Remove the TCM
   1) Disconect the TCM connector (A).



   2) Remove the TCM (D) after loosening the mounting nuts (B) and then bolts (C).

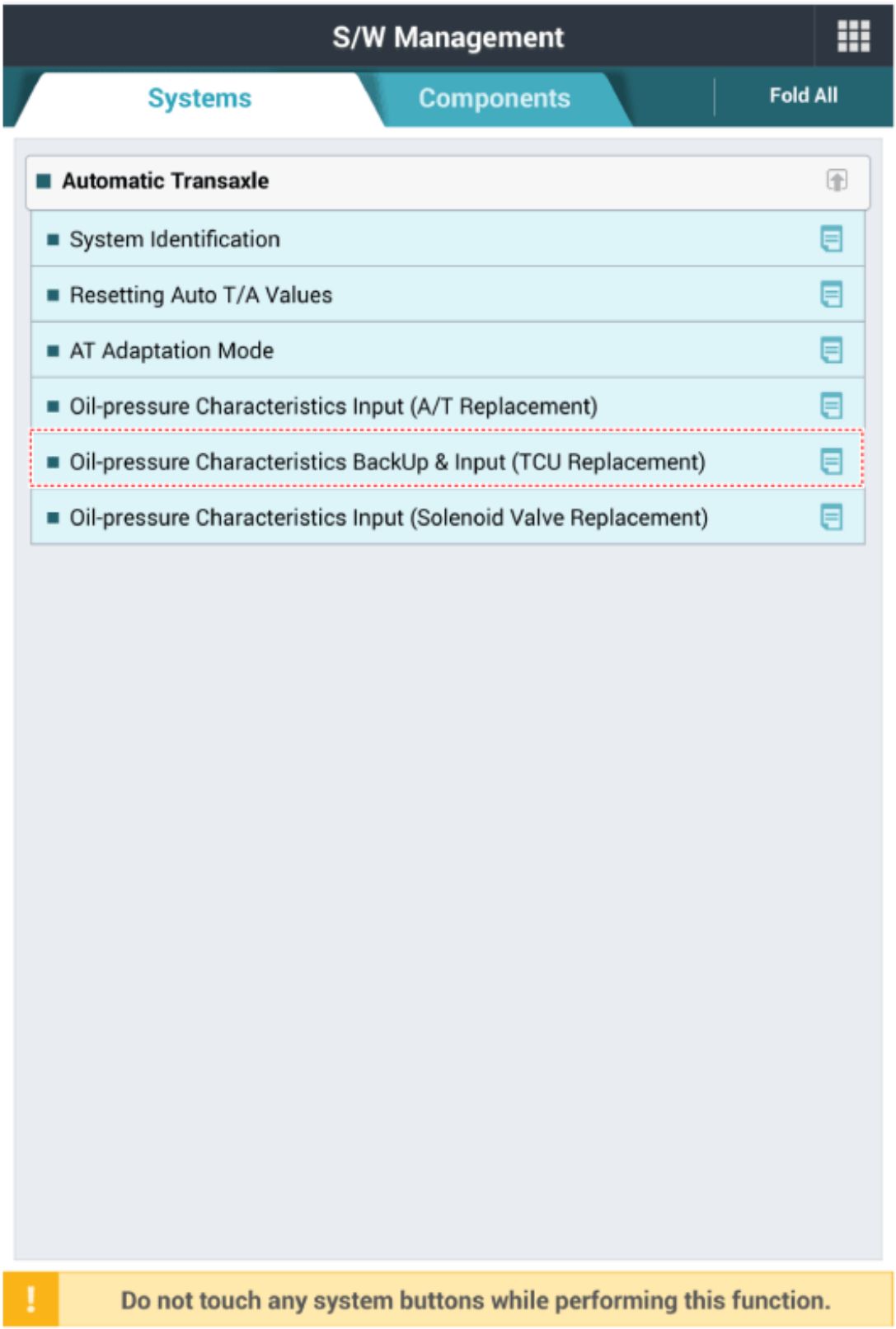


   3) Remove the TCM (F) after loosening the nuts (E) from the bracket.



- Installation

1. To install, reverse the removal procedure.
2. Perform the oil pressure characteristics input procedure using the diagnostic tool when replacing with a new TCM.

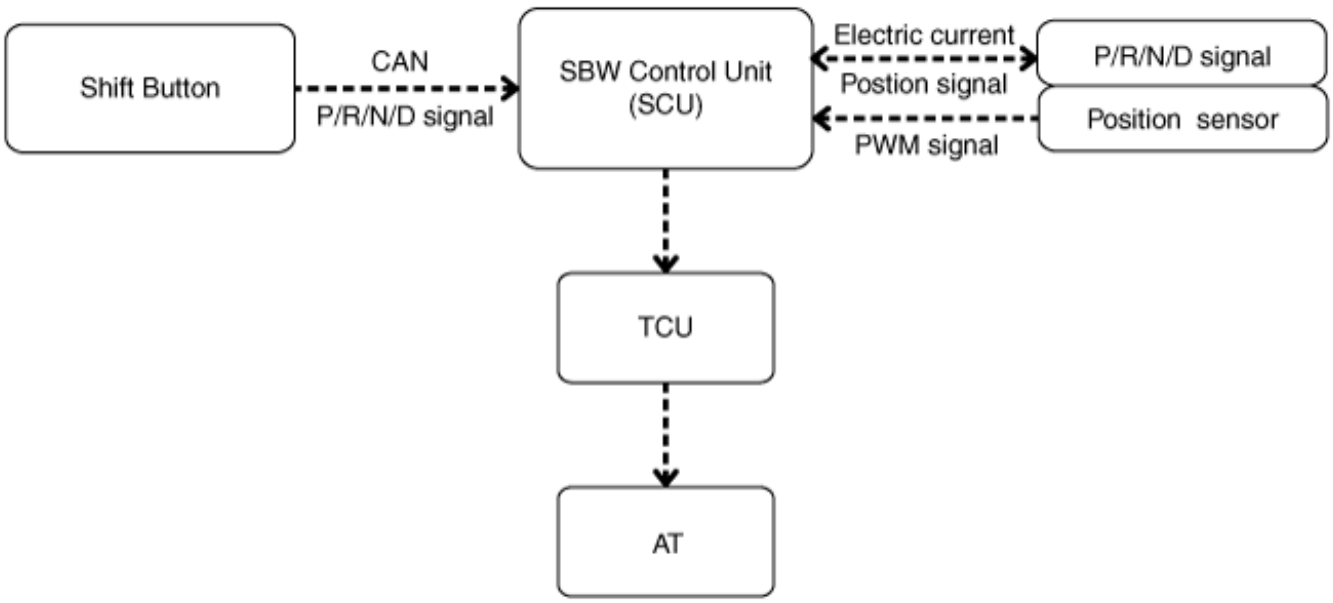


3. In order to avoid any problem including sense of starting delay of the transaxle and shock at acceleration and vehicle start, make sure to process learning for TCM after replacing the transaxle / TCM.
   (Refer to Automatic Transaxle Control System - "Repair Procedures")

Automatic Transaxle System (A8LF1)

- Description

Controls the 4 position of P(Parking), R, N, D using the rotation of the motor of according to the electric signal when the shift button is operated.

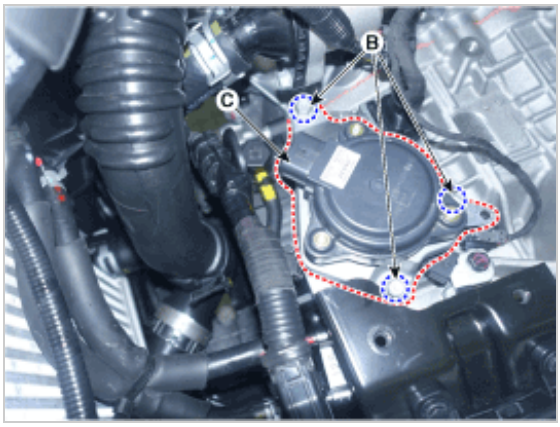


- Removal

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and the air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Disconnect the electronic shift actuator connector (A).

5. Remove the bolt (B) and then remove the electronic shift actuator (C).

Tightening torque :
20.6 - 26.5 N.m (2.1 - 2.7 kgf.m, 15.2 - 19.5 lb-ft)



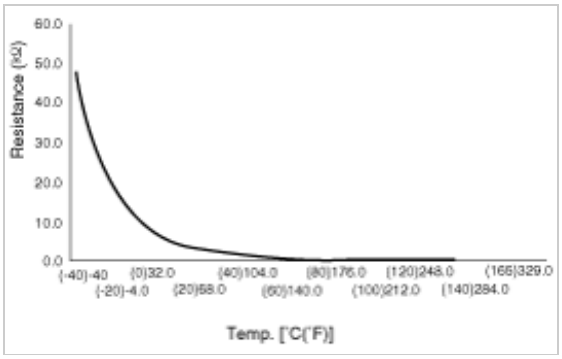
- Installation

1. To install, reverse the removal procedure.

- Specification

▷ Type: Negative Thermal Coefficient Type

Temp [(˚C)˚F]	Resistance (kΩ)
(-40) -40	48.1
(-20) -4.0	15.6
(0) 32.0	5.88
(20) 68.0	2.51
(40) 104.0	1.120
(60) 140.0	0.612
(80) 176.0	0.329
(100) 212.0	0.186
(120) 248.0	0.109
(140) 284.0	0.067
(150) 302.0	0.053

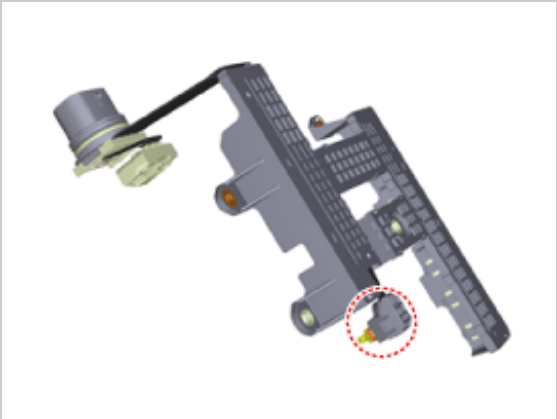


- Description

- The sensor used is a thermistor (NTC) in which resistance changes with temperature variation.
- Transmission oil temperature sensor monitors the automatic transmission fluid's temperature and conveys the readings to TCM.
- When the TCM supplies about 5 V of power to sensor, the sensor output value changes depending on ATF temperature.
-

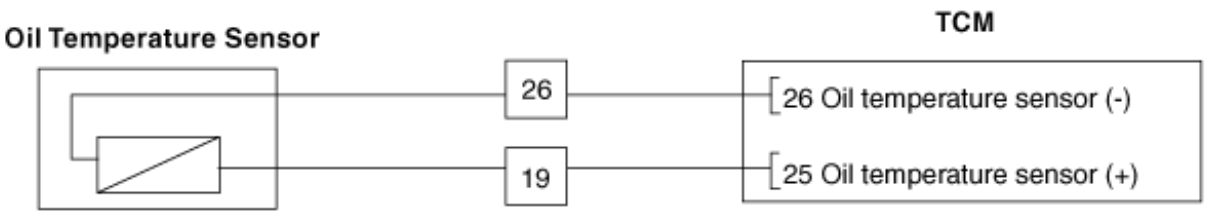
It is an NTC (Negative Thermal Coefficient) sensor whose resistance has an inversely proportional relationship with the temperature level.Data produced by this sensor is used to identify damper clutch activation and deactivation zones within the low temperature and high temperature range and to perform hydraulic amendment control during gear changes.

- Oil temperature sensor is installed on the valve body and is integrated with main harness.

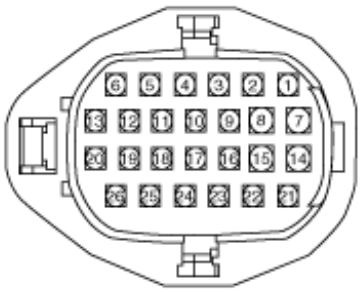


- Circuit Diagram

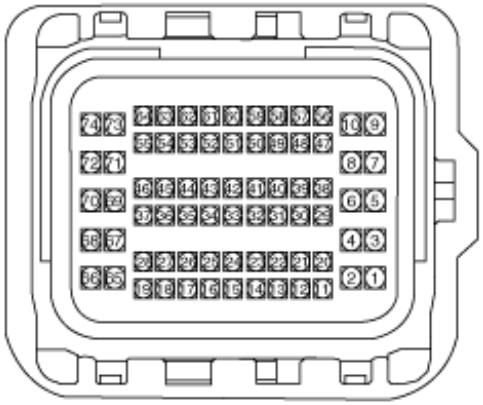
[Circuit Diagram]



[Connector]



[Main connector]



[TCM connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

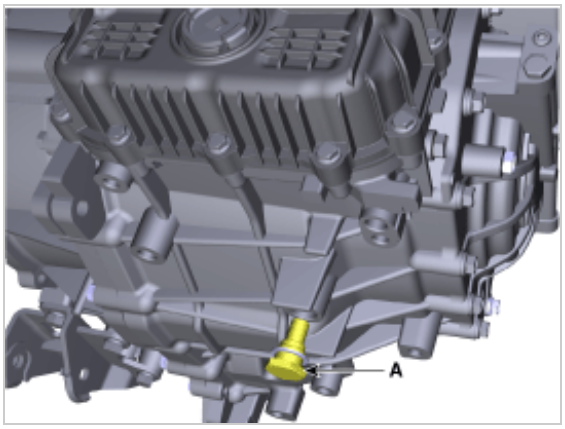
- Removal

CAUTION

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
- Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Engine Mechanical System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

   Tightening torque :
   33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

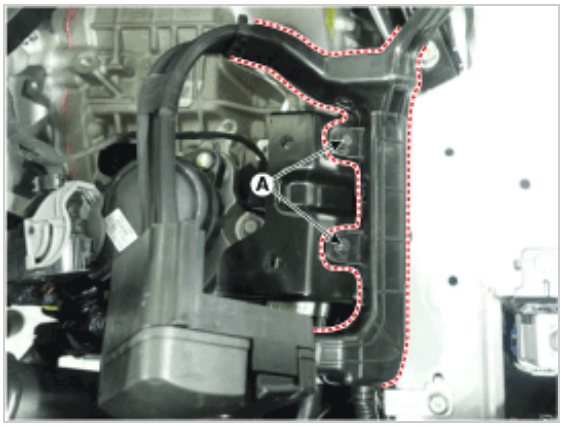
7. Loosen the fixing bolt (A) and then removing the bracket.

   Tightening torque :
   9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

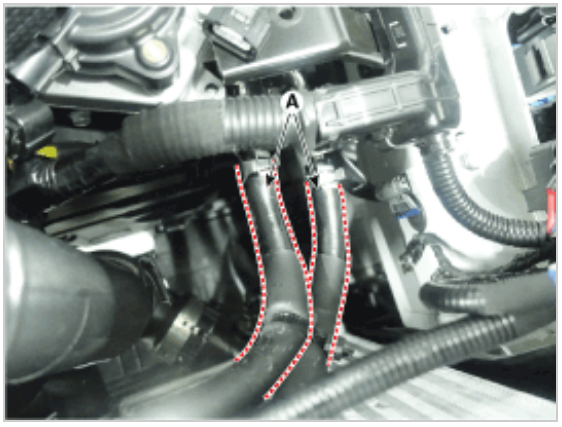
8. Loosen the fixing bolts (A) and then removing the bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Separate the ATF cooler hose (A).



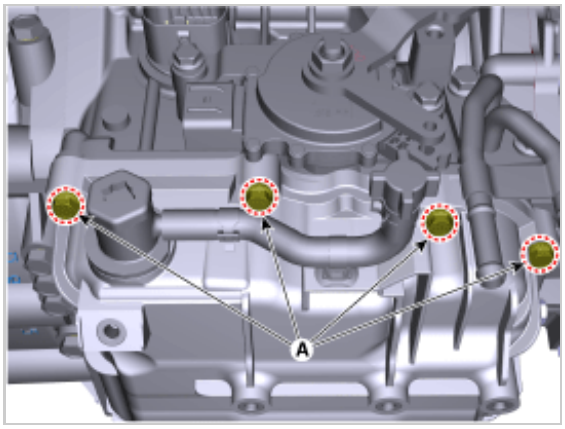
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



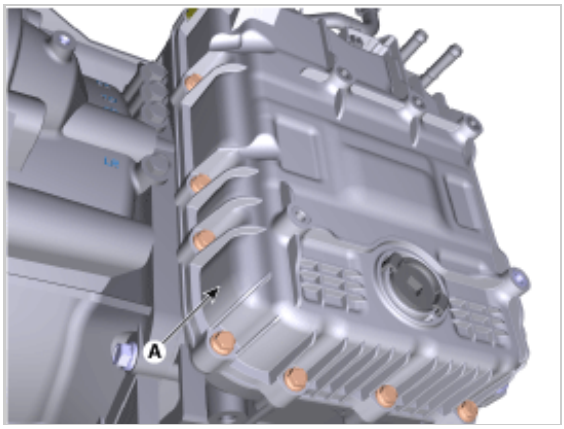
11. Loosen the bolts and then removing the valve body cover (A).

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

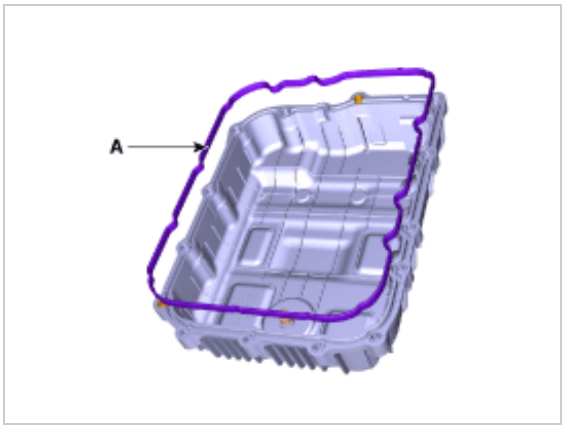
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

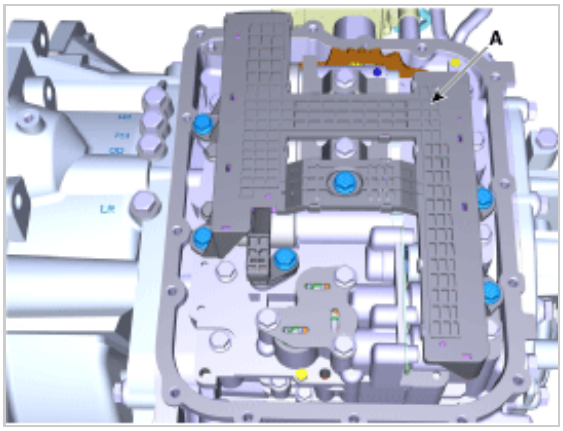
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then separate the main harness (A).

Tightening torque :

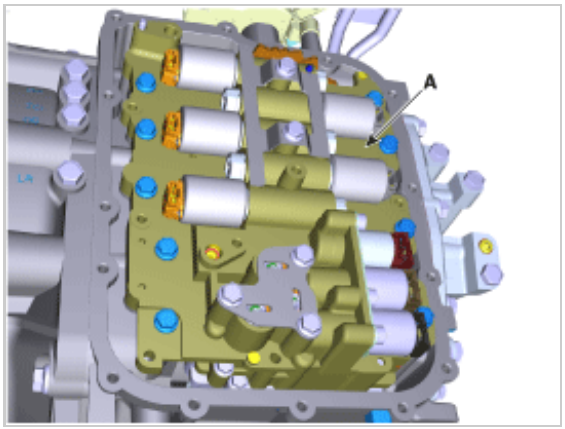
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



13. Loosen the bolts and then removing the valve body assembly (A).

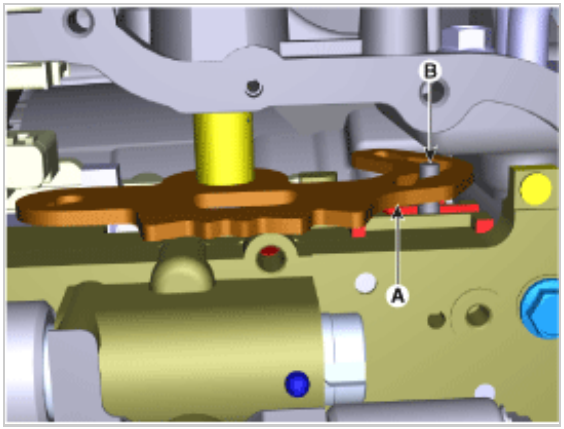
Tightening torque :

(A) 9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)

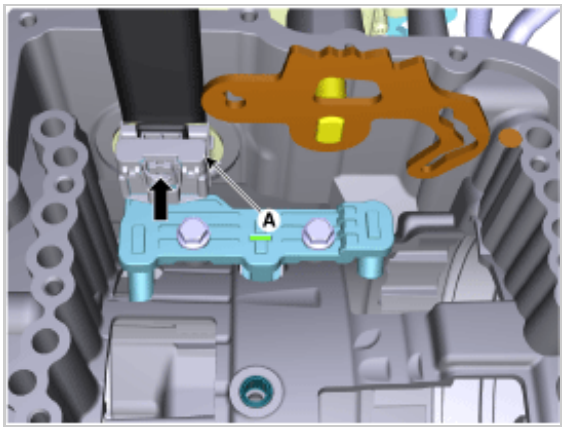


⚠ CAUTION

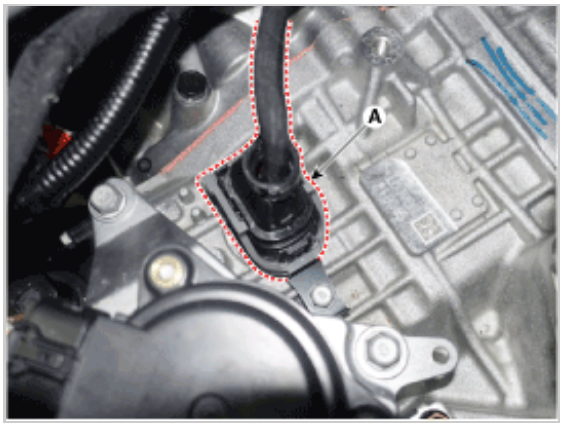
- Attach the manual pin (B) to the detent lever (A) and assemble the valve body.



14. Disconnect the speed sensor connector (A).



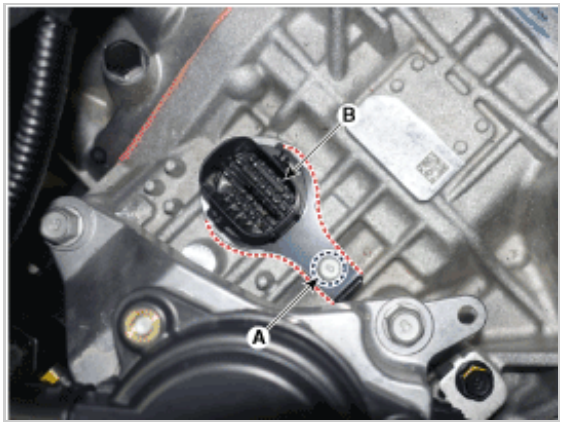
15. Disconnect the main connector (A).



16. Loosen the bolt and then removing the fixing of clip (A).

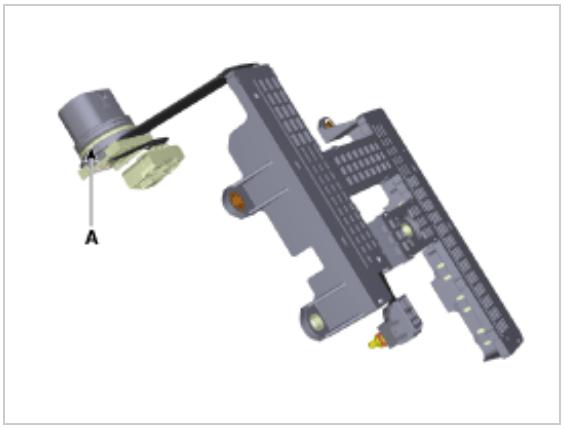
Tightening torque :
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)

17. Remove the main connector (B) by pushing it downward.



⚠ CAUTION

- Replace the O-Ring (A) before reinstalling solenoid valve connector.



- Installation

1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")

⚠ CAUTION

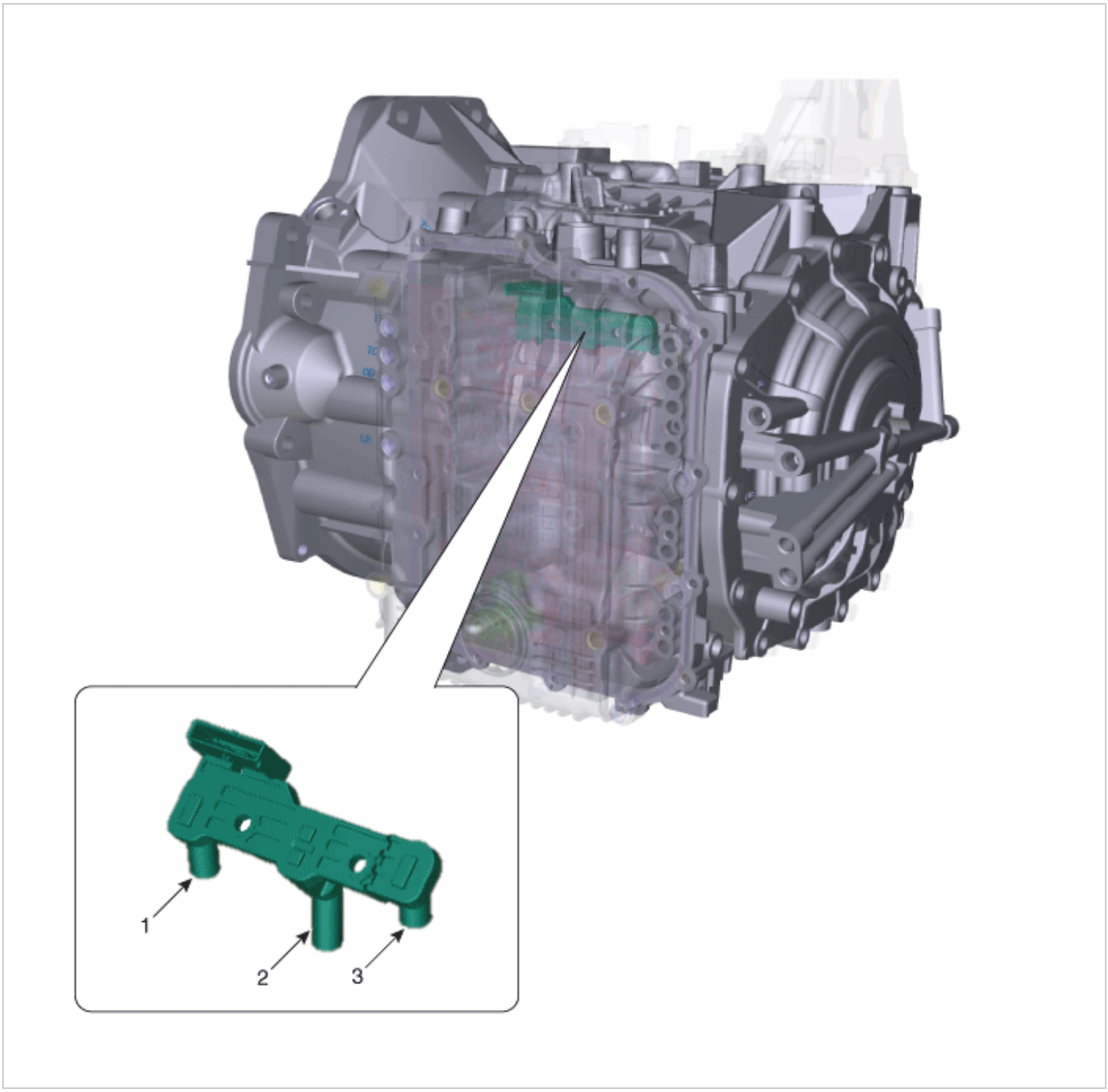
- After ATF level check or exchange, be sure to remove residual ATF on transaxle case.
  (Be especially sure to remove residual ATF between automatic transaxle case and valve body cover)

- Specification

▷Type : Hall effect sensor

Item		Specification
Operating condition (˚C)˚F		(-40 to 150) -40 to 302
Output voltage (V)	High	1.18 - 1.68
	Low	0.59 - 0.84

- Component Location



1. Input speed sensor
2. Output speed sensor
3. Middle speed sensor

- Description

- Speed sensor is the input, middle ,output speed sensor of consists.
- Speed sensor is a vital unit that measures the rate of rotation of the input shaft inside the transmission and delivers the readings to the TCM.

  Input speed sensor : Used for detecting the speed of OD drum

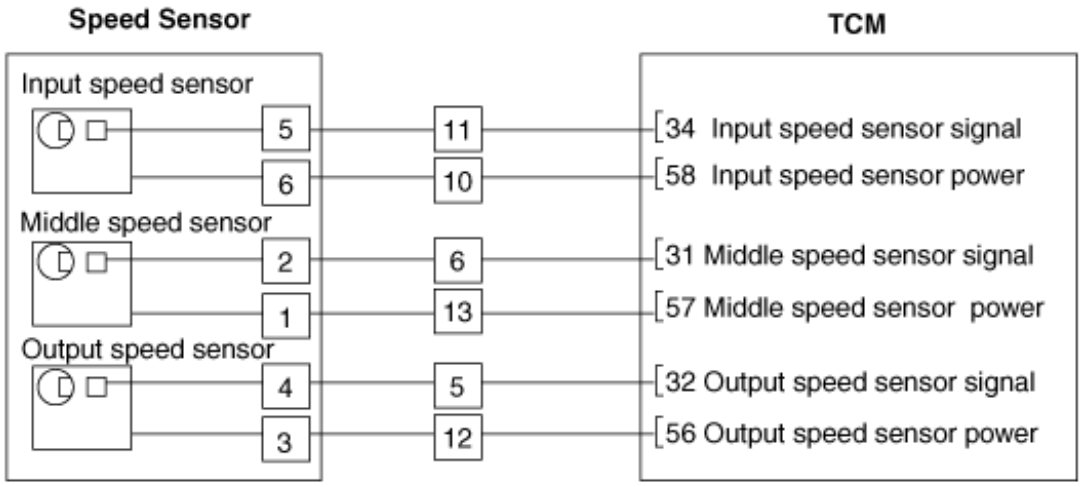
  Middle speed sensor : Used as a signal for reducing the engine torque to prevent secondary damage during abnormally fast rotation

Output speed sensor : Used for detecting the speed of transfer drive gear

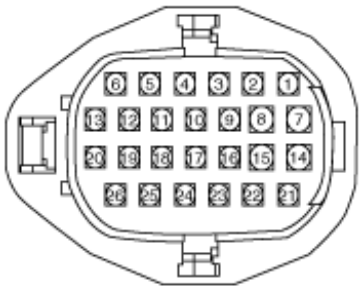
- The sensor provides critical input data used in feedback control, torque converter clutch control, gear setting control, line pressure control, clutch activation pressure control, and sensor fault analysis.

- Circuit Diagram

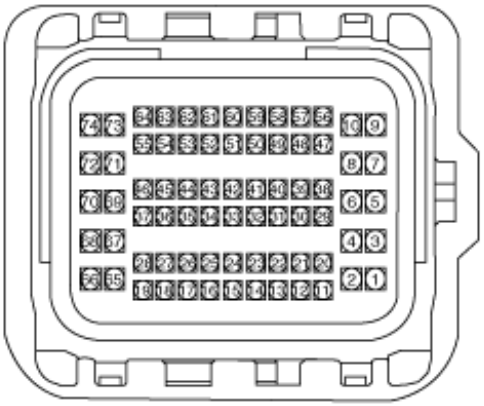
[Circuit Diagram]



[Connector]



[Main connector]



[TCM connector]

- Inspection

Information

- Refer to the DTC manual for the check procedure.

- Removal

CAUTION

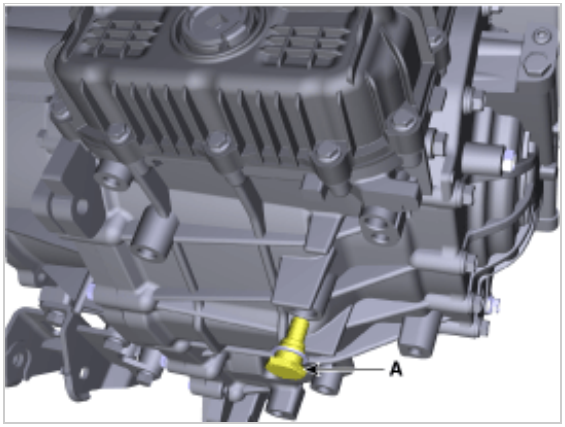
- When the solenoid valve Diagnostic Trouble Codes (DTC) is on, perform the following procedure to replace it.
- Automatic transaxle is composed of delicate components. Be careful not to cause any damage on the component in the course of assembly and disassembly.
- Maintain clean condition so that foreign substance does not get into the automatic transaxle.
- Use a coated apron, latex gloves, and stainless tray to prevent foreign substance from getting into the transaxle.
-

Automatic transaxle fluid (ATF) can be reused. Collect it using a clean 10-liter beaker.

- Be careful not to damage the parts located under the vehicle (floor under cover, fuel filter, fuel tank and canister) when raising the vehicle using the lift.
  (Refer to General Information - "Lift and Support Points")

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Remove the under cover.
   (Refer to Engine Mechanical System - "Engine Room Under Cover")
5. Drain the coolant.(If equipped ATF warmer)
   (Refer to Engine Mechanical System - "Coolant")
6. Loosen the drain plug (A) and reinstall the drain plug after draining ATF totally.

Tightening torque :
33.3 - 43.1 N.m (3.4 - 4.4 kgf.m, 24.6 - 31.8 lb-ft)



NOTICE

- Replace the gasket before reinstalling the drain plug.

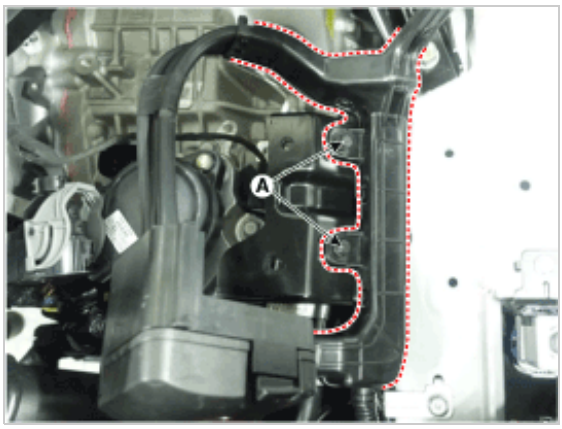
7. Loosen the fixing bolt (A) and then removing the bracket.

Tightening torque :
9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)

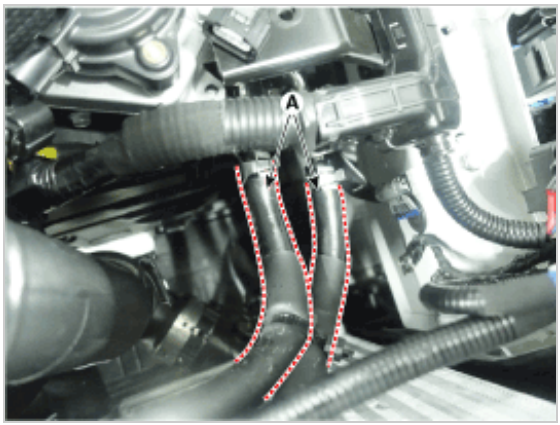
8. Loosen the fixing bolts (A) and then removing the bracket.

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. Separate the ATF cooler hose (A).



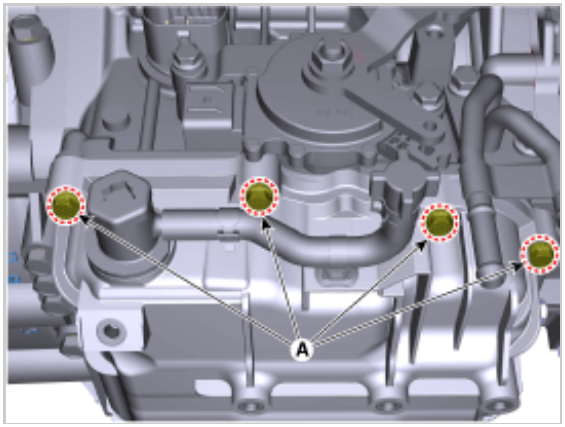
⚠ CAUTION

- Carefully install the clamp not to damage the hose.
- Install the clamp in a correct direction not to be interfered with other parts.
- After the installation, start the engine and then check if there are any leakages from the hose.

10. Loosen the upper bolts (A) of the valve body cover.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)



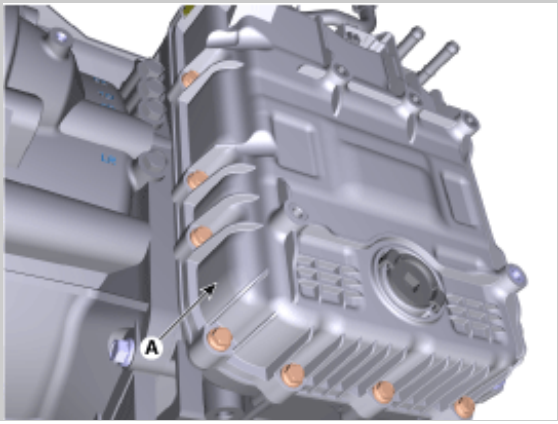
11. Remove the valve body cover (A) after removing the bolts.

Tightening torque :

11.8 - 13.7 N.m (1.2 - 1.4 kgf.m, 8.7 - 10.1 lb-ft)

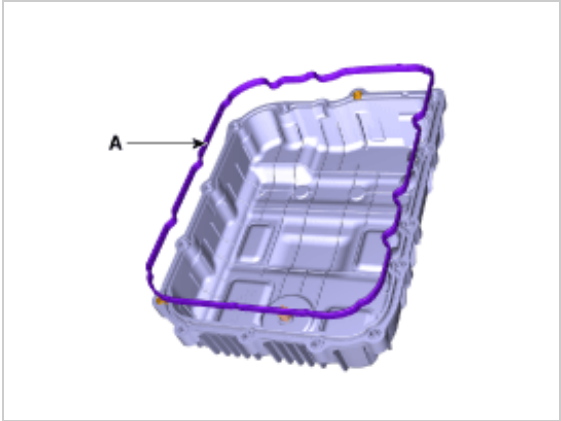
⚠ CAUTION

- Be careful when removing the valve body cover because the remaining ATF remains in the valve body cover.



⚠ CAUTION

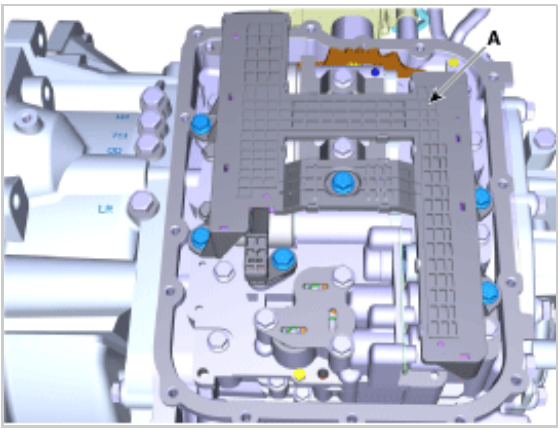
- Replace the gasket (A) before reinstalling the valve body cover.
- After the installation, start the engine and then check if there are any leakages from the valve body cover.



12. Loosen the bolts and then Separate the main harness (A).

Tightening torque :

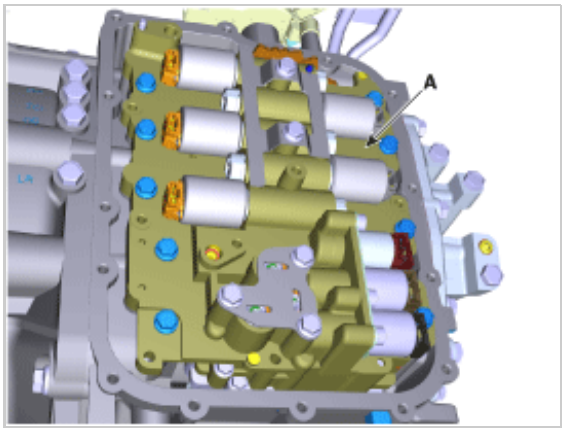
9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)



13. Remove the valve body assembly (A).

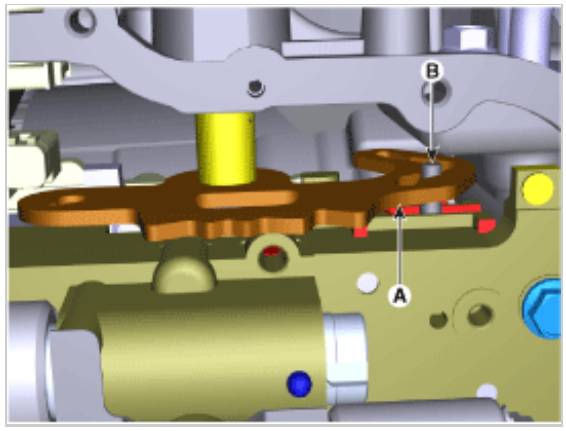
Tightening torque :

(A) 9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)

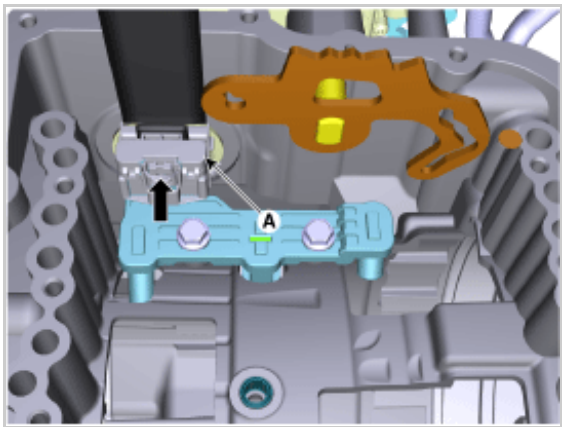


CAUTION

- Attach the manual pin (B) to the detent lever (A) and assemble the valve body.



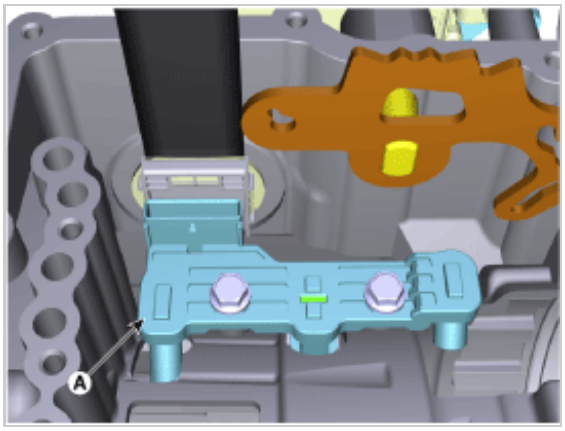
14. Disconnect the speed sensor connector (A).

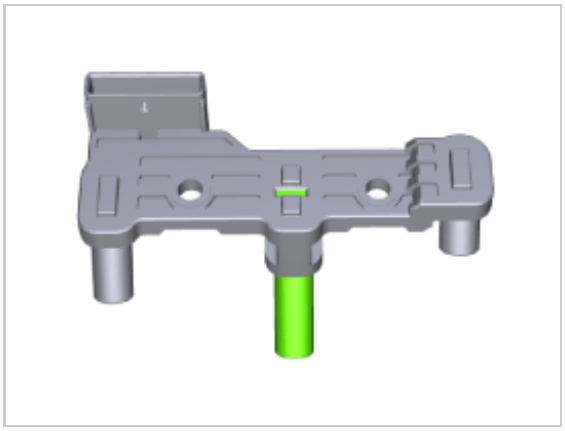


15. Loosen the bolts and then removing the speed sensor (A).

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf·m, 7.2 - 8.7 lb-ft)





- Installation

1. To install, reverse the removal procedure.
2. Inject the automatic transaxle oil and inspect the oil level.
   (Refer to Automatic Transaxle System - "Automatic Transaxle Fluid")

> **⚠ CAUTION**
>
> • After ATF level check or exchange, be sure to remove residual ATF on transaxle case.
> (Be especially sure to remove residual ATF between automatic transaxle case and valve body cover)

Automatic Transaxle System (A8LF1)

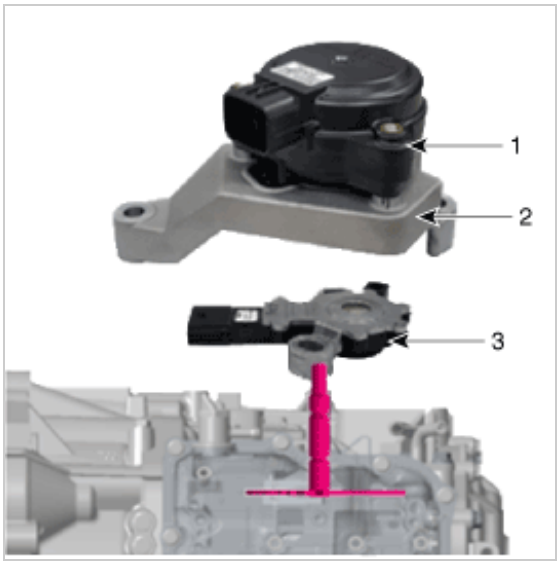
- Specification

Item	Specification	
Power supply (V)	4.5 - 5.5V	
Output type	Shifting range	Non-contact (2 channel PWM signal)

Automatic Transaxle System (A8LF1)

- Description

Output position signal(P,R,N,D) by the actuator operation to the controller (SBW Control Unit_SCU).



1. Electric shift actuator
2. Bracket
3. Position sensor

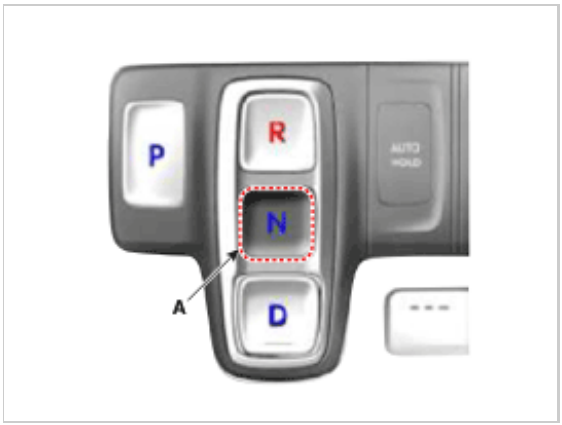
- Troubleshooting

Major Symptom	Expected Cause	Items to Check and Measures
Shock when shifting to and from D/R Motor run-up when shifting to and from D/R	Faulty position sensor "N" setting	Use the "N" setting jig and adjust the "N" setting. (Refer to "Automatic Transaxle System – Position Sensor")
	Faulty oil pressure in the valve body	Replace valve body assembly or inspect/replace transaxle assembly
Faulty engine start Current gear not indicated in the Cluster Warning Lamp ON Engine stall while stopped Creeping not possible Auto parking release disabled	Faulty CAN terminating resistance/circuit	Check TCM/battery management system module.
		Check TCM wiring connector connection.
	Faulty position sensor circuit fuse	Check fuse and junction box terminal, and repair.
	Faulty position sensor wiring connector	Check for foreign substance in the wiring connector, and check for gap on the terminal.
		Check sealing on unused pin, and check for corrosion on the terminal.
	Faulty reverse lamp circuit	Check reverse lamp ground, and reassemble if necessary.
	Faulty position sensor wiring ground	Check wiring ground, and reassemble if necessary.
	Position sensor faulty code	Inspect in accordance with the inspection flow, then replace position sensor if necessary.

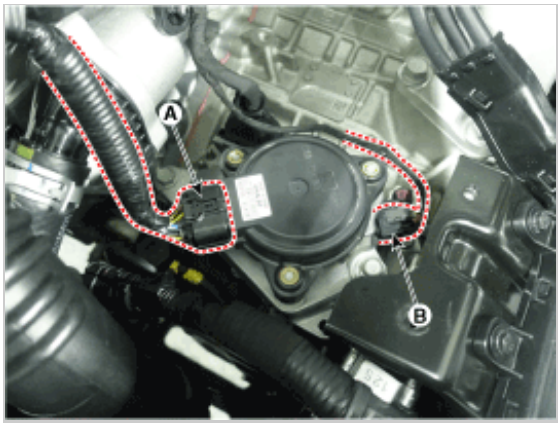
- Removal

NOTICE

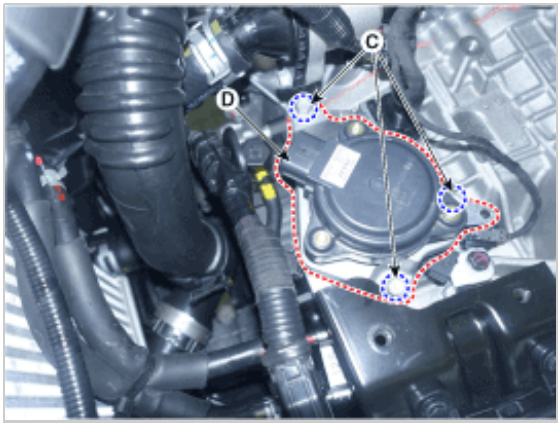
- Before removing position sensor, long press the "N" button (A) and position it at the "N".



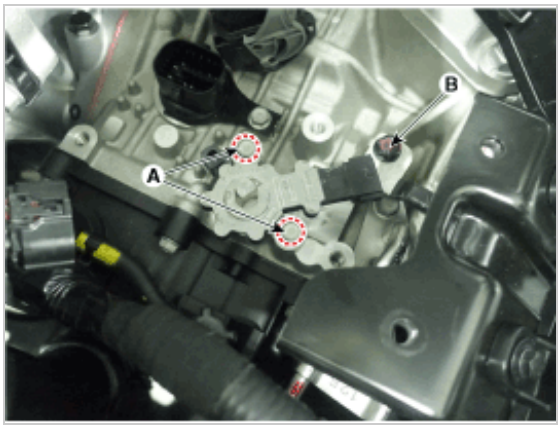
1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the battery and battery tray.
   (Refer to Engine Electrical System - "Battery")
3. Remove the air duct and the air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
4. Disconnect the position sensor connector (A).
5. Disconnect the electronic shift actuator connector (B).



6. Remove the electronic shift actuator (D) after removing the bolts (C).

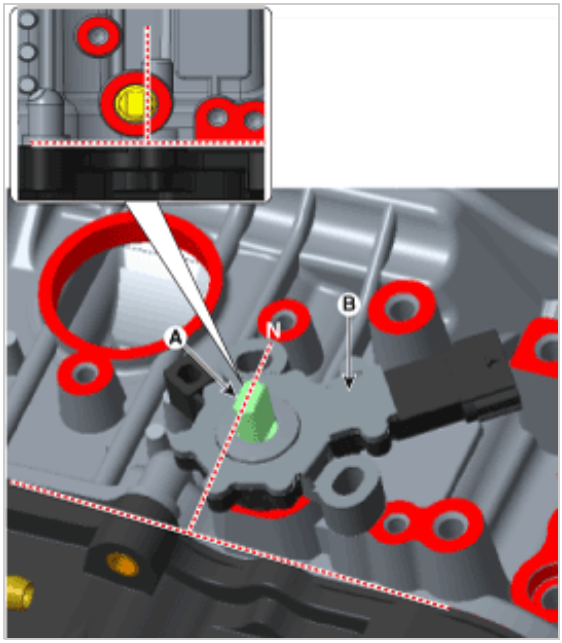


7. Remove the position sensor (B) after removing the bolts (A).

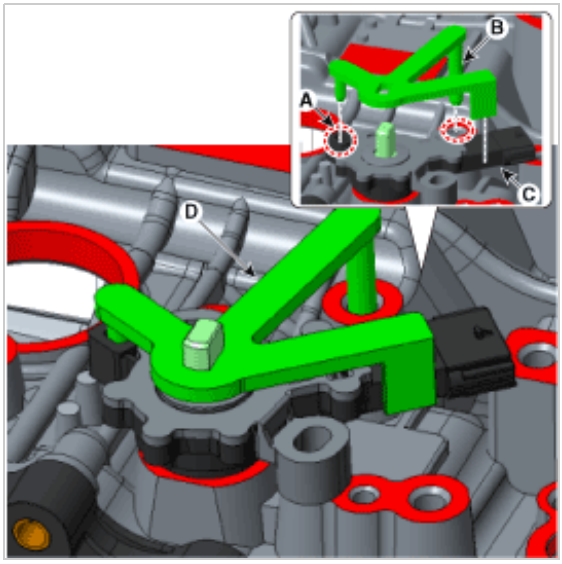


- Installation

1. Check that the shaft (A) is in the "N" position.
2. Install the position sensor (B).



3. Install the position sensor "N" fixing SST(No.:09459 - 4G100)(D) in the sensor (A), case pin (B) and anti-rotation guide (C).

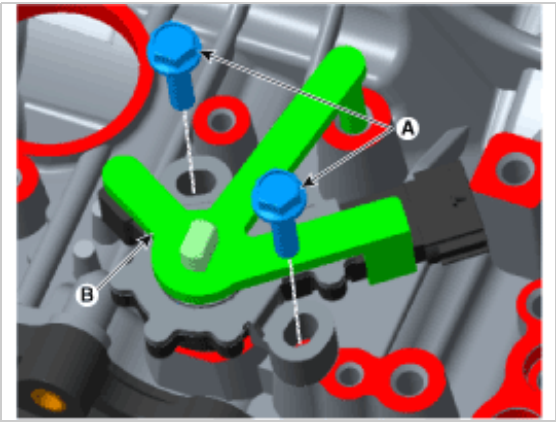


4. Install the bolts (A) in the position sensor.

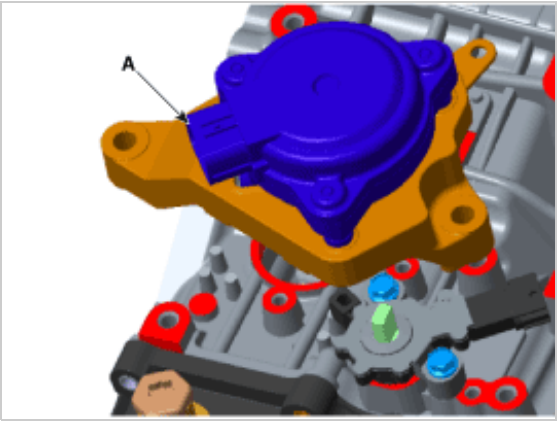
Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 28.9 - 33.9 lb-ft)

5. Remove the position sensor "N" fixing SST(No.:09459 - 4G100)(B).



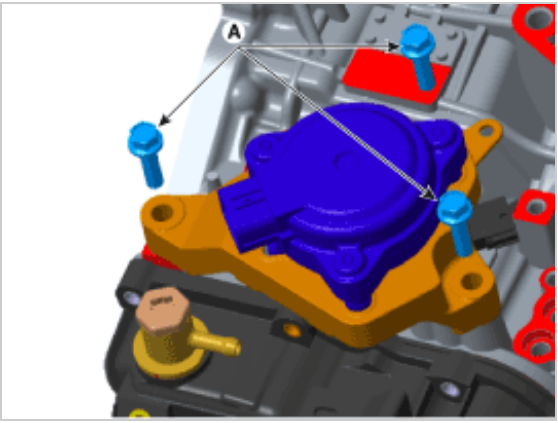
6. Install the electric shift actuator (A).



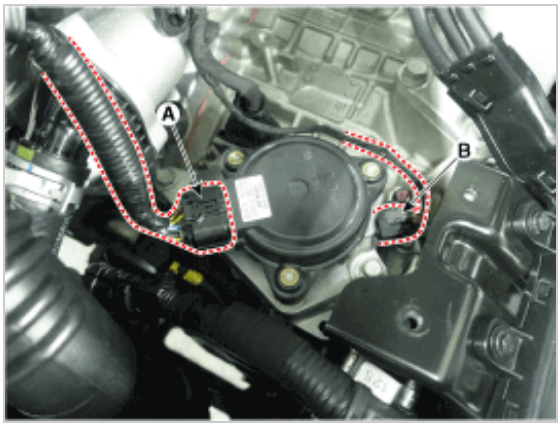
7. Install the bolts (A).

Tightening torque :

20.6 - 26.5 N.m (2.1 - 2.7 kgf.m, 15.2 - 19.5 lb-ft)



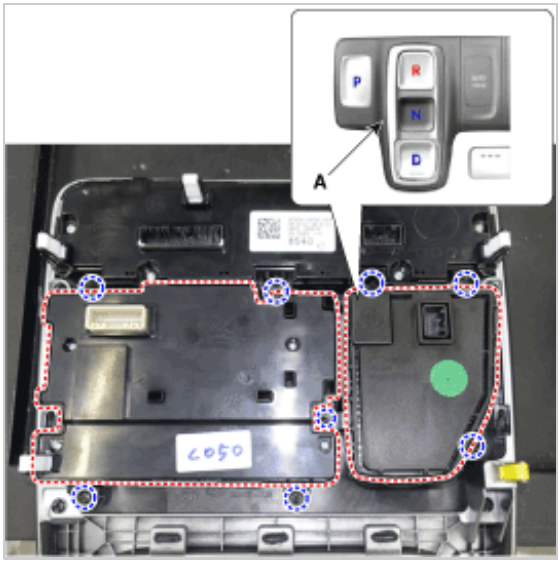
8. Connect the electric shift actuator (A) and position sensor (B).



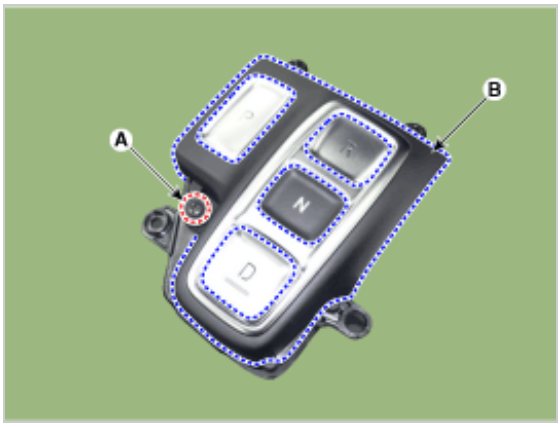
9. Install the air duct and the air cleaner assembly.
   (Refer to Engine Mechanical System - "Air Cleaner")
10. Install the battery and battery tray.
    (Refer to Engine Electrical System - "Battery")
11. Check that operating surely at each range of the position sensor corresponding to each position of electric shift button.

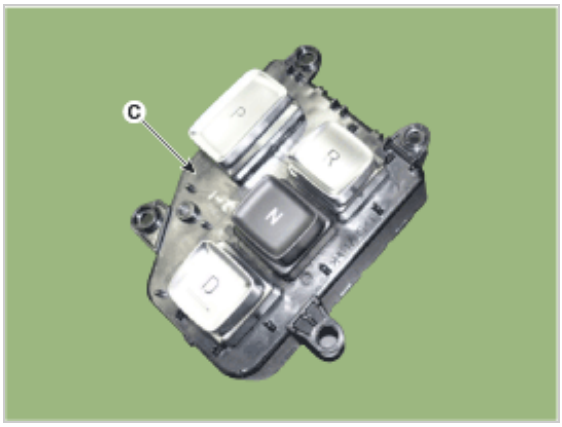
- Removal

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Remove the console upper cover.
   (Refer to Body - "Floor Console Assembly")
3. Remove the electric shift button (A).



4. Loosen the screw (A) and then disconnect the upper cover (B) with the shift button module (C)

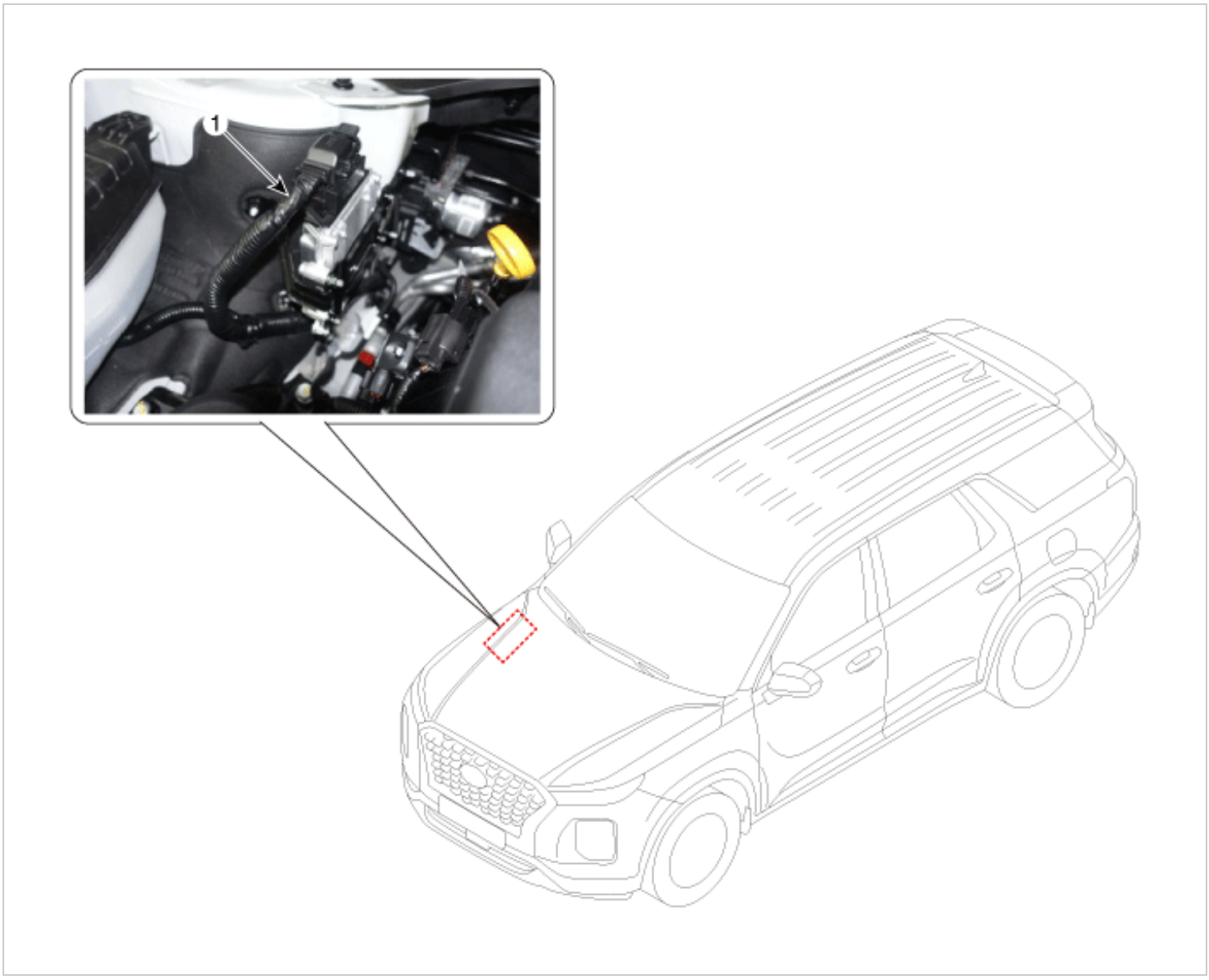




- Installation

1. To install, reverse the removal procedure.

- Component Location

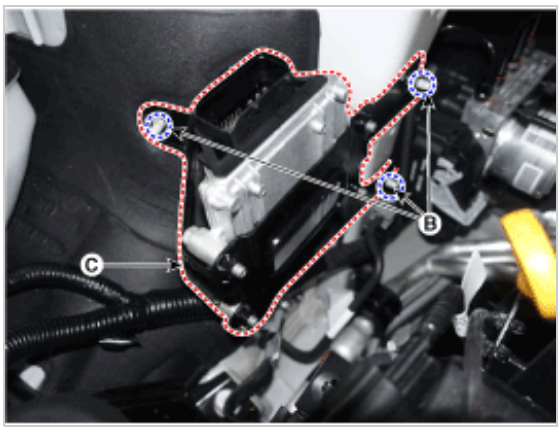


1. SBW Control Unit (SCU)

- Removal

1. Turn ignition switch OFF and disconnect the negative (-) battery cable.
2. Disconnect the connector (A).

3. Remove the SBW Control Unit (SCU) (C) after removing the nuts (B).



- Installation

1. To install, reverse the removal procedure.